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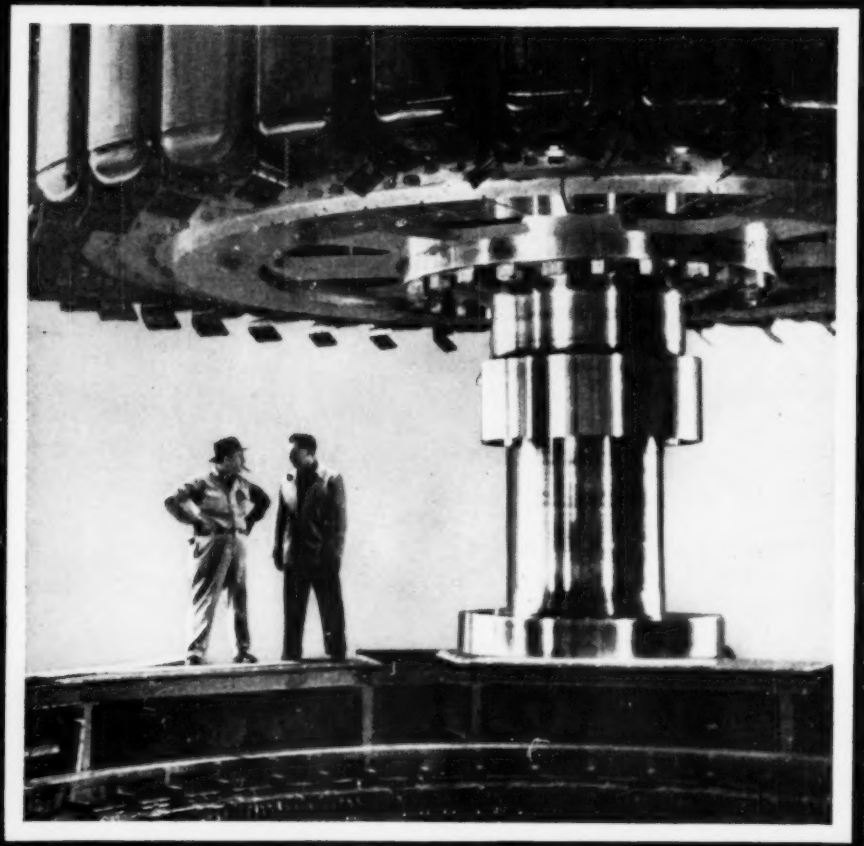
BUSINESS · ENGINEERING · INDUSTRY



Around the World With IGE—Page 19

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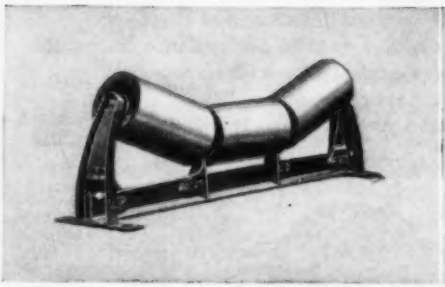

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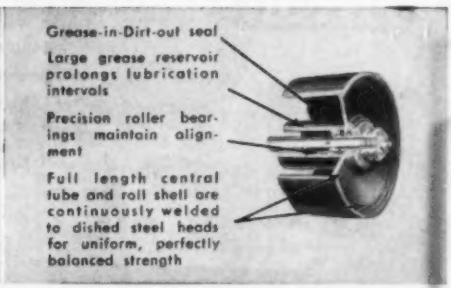
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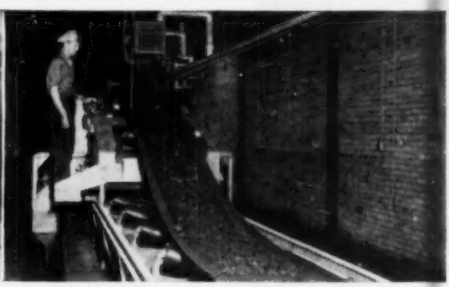

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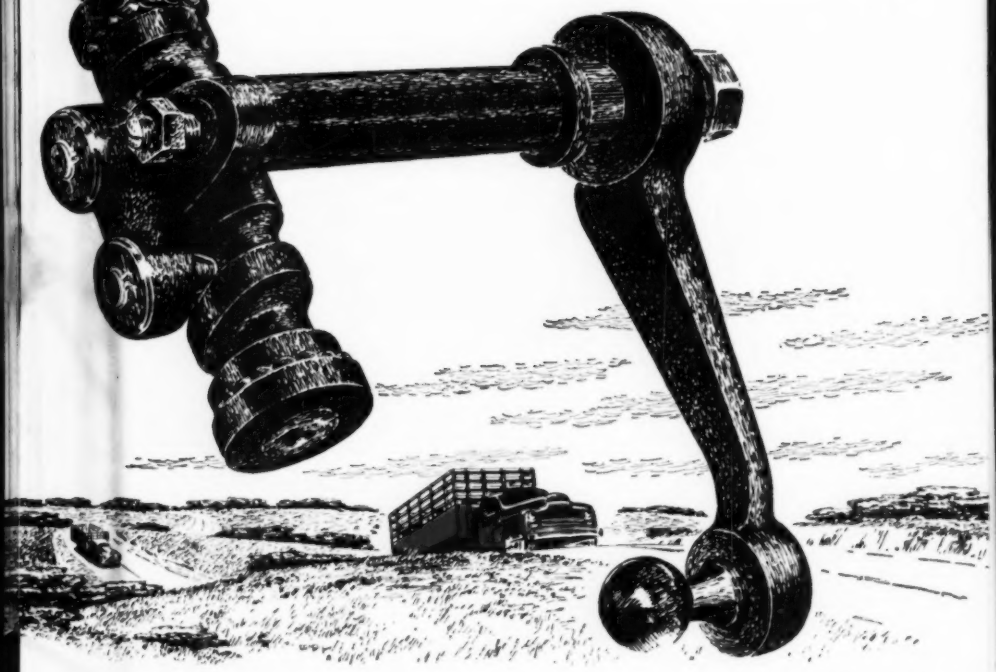

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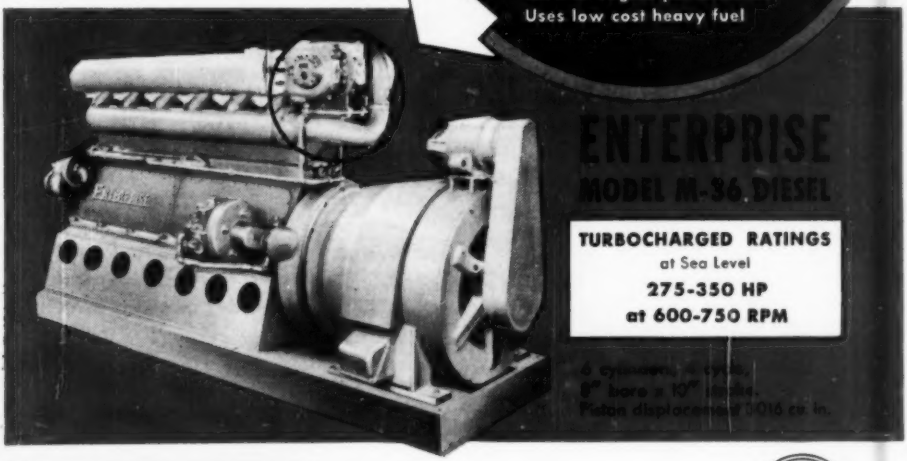

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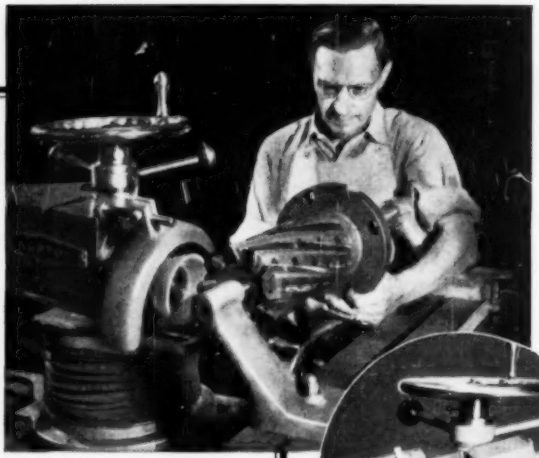

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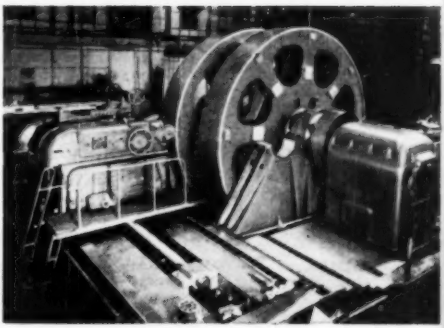

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BUSINESS TRENDS

U. S. PRIVATE INVESTMENT abroad dropped last year—and it will not be up much in 1952. But you can expect a big increase in foreign investment within the next few years.

Net outflow of private long-term funds in 1951 was about $900-million, off $270-million from 1950. Reinvestment of foreign earnings of American-controlled companies stayed steady, near the 1950 total of $443-million.

Completion of petroleum investment programs accounts for much of the decline in foreign investment. U. S. oil companies added about $2.5-billion to their overseas investment between 1945 and 1950. That counts for roughly half of all additions to U. S. properties abroad during that period. But by 1951 this expansion had caught up with U. S. oil needs as they were projected after the war, and the oil companies cut their foreign investment accordingly. For some countries, this cutback in U. S. oil dollars meant an abrupt turnabout in the direction of the dollar flow.

But this trend is due to be reversed. Post-Korean industrial buildup in the U. S. has again boosted needs for oil and other minerals. Shortages of key metals—copper, tungsten, nickel, and others—are hurting U. S. industry.

Domestic sources of iron ore are being run down by the record demand for steel. And demand for petroleum products has grown much faster than the oil industry expected. All this is already forcing more investment in natural resources abroad, and it means much more investment in the future.

Washington wants even more private investment abroad. Government officials would like to see U. S. industry investing $2.5-billion a year in overseas facilities. That rate of spending would boost development in other countries, and it would provide dollars to finance U. S. exports to those countries that need them, thus help take a big load of foreign aid out of the U. S. budget.

It will take time to reach the $2.5-billion goal. Right now, a lot of problems—some here, some abroad—combine to hold investment down.

Export and import restrictions bother U. S. companies operating abroad. Import controls limit the amount of equipment they can get to modernize plants. Export license systems force them to produce whatever the local government will let them export rather than what they would like to produce. Fear of expropriation and general instability abroad and the attraction of good investment opportunities of home also cut the outflow of U. S. capital. On top of all this, dollar restrictions may prevent companies from bringing profits home.

But these problems have been present all along, and they have not prevented big investment totals in the past. Experts figure that U. S. private foreign invest-

ment will work up gradually toward the goal of an annual $2.5-billion and may reach it within the next 5 years.

KEY METAL in the U. S. today is copper. Defense needs are now taking 40% of the available copper, and defense will need even more copper later in the year.

Copper shortages are directly responsible for cutbacks in consumers durable goods—automobiles, television sets, new houses. There should be enough steel and aluminum in 1952 to hold output of all these goods at 1951 levels. But copper shortages will force cutbacks ranging from 10 to 25%.

Supply of other major metals is increasing fast. U. S. steel output may reach 110- to 112-million tons in 1952, an increase of 13 to 15% over the 97-million tons in 1950. Aluminum output is expected to set a new record of more than 2.0-billion lb., up about 20% in just a year. By 1954, aluminum capacity will be close to double what it was in 1950.

But domestic output of copper cannot match these increases. This year's output will rise only a few percent over 1951's 950,000-tons. Any imports, which dropped markedly last year, will not be up much in 1952.

This is a long-term problem. It takes years to open new copper mines. In the meantime, U. S. manufacturers are stretching what copper they can get by changing designs and using substitutes. Some examples: clay pipe instead of copper for radiant heating in houses; plastic or glass door knobs instead of brass; aluminum-wound motors. All this helps. But copper will continue to be a major headache to U. S. industry for years.

EXPORTS of U. S. health products are up, and going higher. Shipments of drugs and health products, equipment, and supplies for 1951 were about $550-million. And shipments will rise still further in the future.

Greater production of antibiotics accounts for part of the export increase. Penicillin supplies are now adequate. But output of other antibiotics like streptomycin is still far behind demand in spite of spectacular gains.

Korean war has helped speed development of new drugs and equipment. Among them: methodon, a new morphine substitute; actidione, the new rat repeller; disposable injection devices; new burn dressings. Substitutes for blood plasma, also being used in Korea, will be exported eventually.

World-wide fight against disease will raise demand for all these products. The trade expects to sell more drugs for these purposes: Chloromycetin, aureomycin, terramycin to combat secondary infections of trachoma; streptomycin and para-aminosalicylic acid for tuberculosis control; sulfonamides for curing or preventing cholera, meningoccal meningitis, dysentery, plague.

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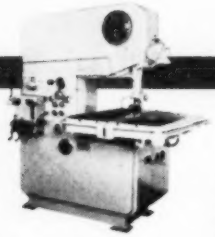

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WASHINGTON REPORT

U. S. CONGRESS is certain to slash foreign aid deeply next year if Western Europe, in the next few months, does not take some dramatic new steps toward federation—logical outgrowths of the single-parliament agreement.

A powerful group of Congressmen has returned from Europe convinced that federation is the only remedy for the continent's chronic economic anemia, the only way of getting the Europeans off the U. S. dole. They are indignant at the slow progress toward integration and want to make fast action toward unity a prerequisite for future American aid.

The Schuman plan and the European army project in its present form will not satisfy these Congressional demands. The least Congress would be likely to accept would be the creation of the genuine supranational European army originally proposed by the French.

Truman's administration is split on how to handle Congressional insistence on speedy European federation. State Department wants to fight any moves to tie aid tightly to unification. It wants Truman to try to convince Congress that Europe is moving as fast as it can toward unity. The new Mutual Security Administration, formerly ECA, favors bowing to Congress, asking to have part of future aid appropriations exclusively earmarked for financing integration.

EUROPEAN REARMAMENT EFFORT could collapse completely if aid were cut sharply because of Europe's failure to move faster toward federation. NATO's three wise men (America's Harriman, Britain's Plowden, and France's Monnet) already have recommended cutting back European defense schedules. They recommended 48 divisions in Europe in 1954 instead of the 90+ SHAPE wanted. SHAPE's 1954 goals would not be met until 1956. The main effort would be concentrated on building a modern 30-division fighting force by the end of 1952.

This cutback would take some pressure off Europe's wobbling economy by scheduling major military production programs over a longer period of time. But Washington economists think that Europe will not be able to make even this smaller total effort without at least as much aid next year as this year. U. S. arms shipments to Europe will have to be stepped up to meet the higher 1952 military goals. And aid will have to be administered to permit more flexible transfer of military to economic aid. Otherwise, Europe's smouldering economic crisis could get out of hand.

MORE POSITIVE APPROACH to its foreign policy is needed by the U. S. American diplomats think the U. S. is losing friends and influence abroad at a dangerous rate. Reason: the U. S. has talked too much about rearmament since Korea, not enough about political, economic, and social policy objectives. That has made

it easy for the Communists to brand Americans as warmongers and to pin the responsibility for Europe's economic difficulties on the U. S.

That is another reason why the administration wants to be able to transfer military to economic aid more freely next year. And U. S. foreign-policy spokesmen will talk a lot more from now on about boosting the standard of living and raising productivity in Europe and the under-developed territories.

There will be action in these fields. Appropriations for exchange of technicians and for bringing European productivity teams to the U. S. will be boosted to $20-million next year compared to this year's $10-million. One expensive new project will bring 1,000 young European workers to the U. S. to train for a year in American industry and technical schools.

INTERNATIONAL MATERIALS CONFERENCE countries have failed to agree on a long-term marketing and price scheme for tungsten. They have had to go ahead with temporary allocations for the first quarter of 1952. No long-term agreement is in sight right now.

This failure to stabilize prices formally is less critical for tungsten now than it was a few weeks ago. Tungsten prices have tended to stabilize themselves in the last few months. The $65 a ton, which the U. S. and other consumer countries wanted the IMC to set as a ceiling, has become the top price in practice anyway. Many contracts have been signed recently at substantially lower prices.

Continuation of this downward price trend would make a long-term price agreement easier to get. And IMC can take some of the credit for the tungsten price slump. Most IMC nations have adhered to their temporary allocations; this has reduced competitive bidding in the world market. But IMC's failure to get a formal tungsten agreement could ricochet against international control of other commodities with prices still under inflationary pressure.

Tungsten was IMC's bellwether commodity for pricing and marketing. A tungsten agreement was expected to set a precedent for similar agreements for other commodities. It is too early to say how seriously other commodity prices may be affected. But it is fairly certain that failure to get control in the next few months over unrestrained price swings of copper, lead, and zinc would torpedo attempts to control raw materials internationally.

ODDS ARE that the Reconstruction Finance Corporation will be forced to re-enter the world tin market soon. RFC has been refusing to meet Bolivian and Malayan tin-producer's prices for nearly a year. But the U. S. tin stockpile is ebbing fast. And RFC is under pressure from the State Department to start buying Malayan tin again to ease the sterling-area's dollar famine.

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Also behind the scenes are Republic's many metallurgists who constantly test new formulas to develop finer and tougher steels for *today's* uses . . . and new types of steels to meet *tomorrow's* requirements of an ever-changing world that seeks progress and better living. *In short, Republic, known the world over for quality steels, IS an important part of that progress and better living.*

★ ★ ★

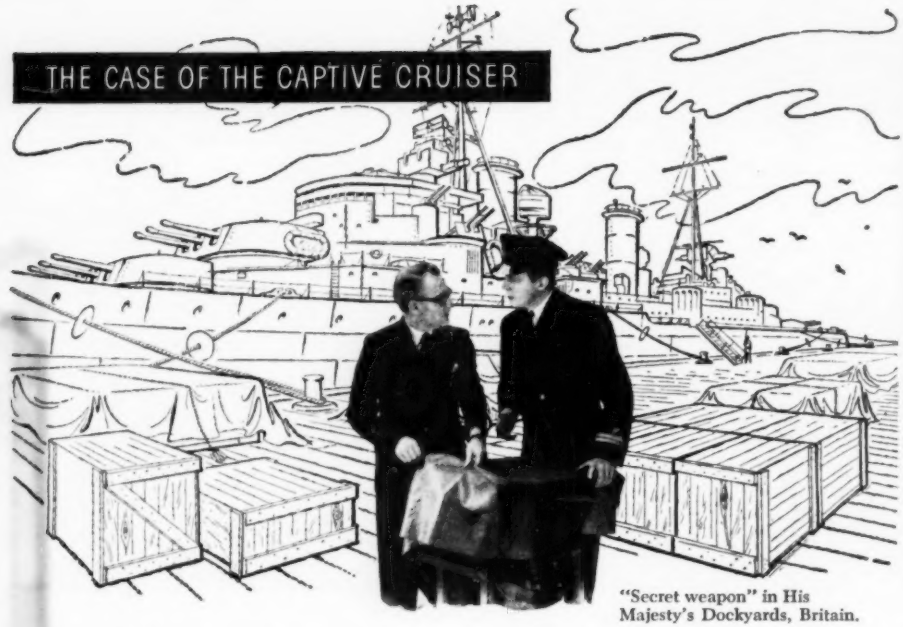
REPUBLIC STEEL PRODUCTS include: Alloy, Carbon and Enduro* Stainless Steels: Rust-resisting Toncan* Iron: Cold Finished Steels: Bars, Shapes, Sheets, Strip, Steel Roofing and Siding, Electrical Steels, Electro-Plated Sheets: Merchant Pipe, Line Pipe, Casing and Tubing for the gas and oil industry, Boiler and Heat Exchanger Tubes, Mechanical Tubing, Conduit: Tin Plate, Terne Plate: Bolts, Nuts and Rivets: Wire Rods, Wire, Nails and Staples, Fence and Fence Posts: Drainage Products: Steel Building Products: Fabricated Steel Products—Shelving, Steel Cabinets for Kitchens, Storage Bins, Office Furniture, Lockers, Steel Containers. *Reg. U. S. Pat. Off.*

REPRESENTATIVES IN PRINCIPAL CITIES OF THE WORLD

KNOWN THE WORLD OVER FOR QUALITY STEELS

Republic Steel Corporation

Export Department
Chrysler Building • New York 17, N. Y., U. S. A.
Cable Address: "TOSCAN" • General Offices: Cleveland 1, Ohio



"Secret weapon" in His Majesty's Dockyards, Britain.

Was there a "secret weapon" to set her free?

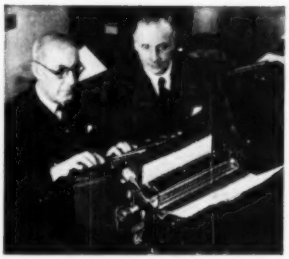
At His Majesty's Dockyards in Britain, *World War II had increased inventory of ship's supplies to almost 300,000 items. Handling this increase with hand accounting methods had become almost impossible despite extra manpower and overtime—speedy stocking of ships was held up by paper work.*

The machine accounting specialists of Burroughs Adding Machine Ltd., were called in. They suggested a simplified system for handling stock cards and ledgers with Burroughs High-Speed Accounting Machines.

Today, the issue of supplies for ships in The Royal Dockyards is never held up by paper work. Work could be tripled without adding a single machine to present equipment.

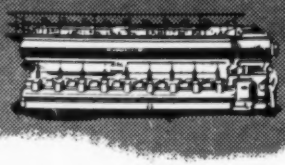
To better *your* business, call the Burroughs man—today. World-wide sales and service. Burroughs Adding Machine Co., Detroit 32, Michigan, U.S.A.

FOR EXPERT ADVICE IN ANY FIELD OF BUSINESS FIGURES...

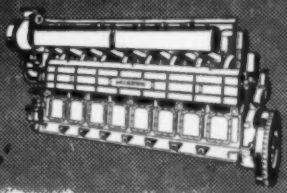


MR. J. E. FOOT, Superintending Naval Store Officer of one of H.M. Dockyards, examines one of his Burroughs machines. On the right is Mr. S. F. Harmer-Elliott, a Burroughs man who helped solve the Case of the Captive Cruiser.

CALL THE **Burroughs** MAN



Nordberg 2-cycle Diesels for marine or stationary service are built in a wide range of types and sizes, from 880 to 10,000 H.P.

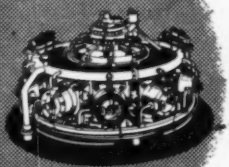


The Nordberg SUPAIRTHERMAL Engine, the outstanding engine of the Diesel field, is available in a complete range of 4-cycle types for all applications, in sizes from 425 to 3200 B.H.P.

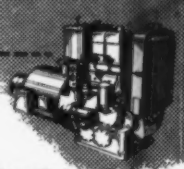
For the best solution to your power problems

NORDBERG

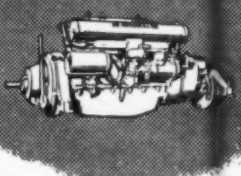
offers a full range of engine types and sizes from 10 to 10,000 horsepower



Nordberg 2-cycle Radial Diesels develop 1820 H.P. or 1290 K.W. at 400 R.P.M. Available as an oil burning Diesel, as a natural gas engine, and as a Duafuel engine.



Nordberg "Packaged" Diesel Power Units—from 10 to 45 H.P., 9 to 30 K.W., for generating electricity, pumping, and straight power applications.



Nordberg Gasoline Marine Engines—in 5 models, from 95 to 145 H.P. for fish boats, tugs, and pleasure craft.

FROM a small general purpose boat up to a huge ocean-going liner . . . or from a 6 kilowatt emergency lighting plant up to power and light for an entire city . . . there is a heavy duty NORDBERG engine ready to do a dependable, economical powering job for you . . . in a wide range of sizes from 10 to 10,000 horsepower, including Diesel, Duafuel, Natural Gas, and Gasoline types.

Write for details, outlining your power requirements.

USE THESE DEPENDABLE NORDBERG PRODUCTS

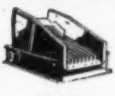
"SYMONS" PRIMARY CRUSHERS

"SYMONS" CONE CRUSHERS

GRINDING MILLS

MINE HOISTS

RAILWAY MAINTENANCE MACHINERY



"SYMONS" VIBRATING BAR GRIZZLIES

"SYMONS" VIBRATING SCREENS

NORDBERG MFG. CO., Milwaukee, Wisconsin, U.S.A. CABLE ADDRESS: NORDBERG

NORDBERG THE WORLD OVER

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Brook House, Park Lane

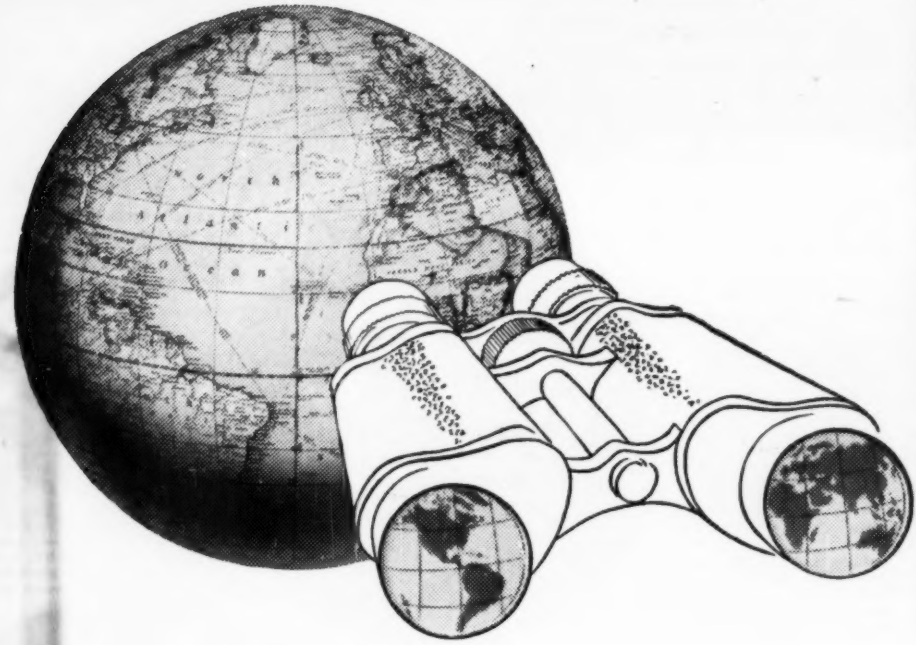
PARIS
8, rue de Beccador

JOHANNESBURG
P.O. Box 4139

MEXICO, D.F.
Dolores 3

XDG152

Dealers in Principal Trading Areas Throughout the World



Clear two-way view of world trade

The Chase National Bank is thoroughly equipped to serve the needs of both importers and exporters. With branches, representatives and correspondents in all commercially important parts of the world, Chase has an up-to-date understanding of the requirements of overseas trade. That's why more and more businessmen are saying

"I like to do business with Chase."

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OF THE CITY OF NEW YORK

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THE CHASE BANK

Paris

February 1952 • McGraw-Hill DIGEST • Volume 7 Number 2

RURAL COLOMBIANS learn through the aid of a GE battery radio. Lessons are broadcast and explained to pupils by an instructor. It is just one instance of what we mean by . . .

Around the World with IGE

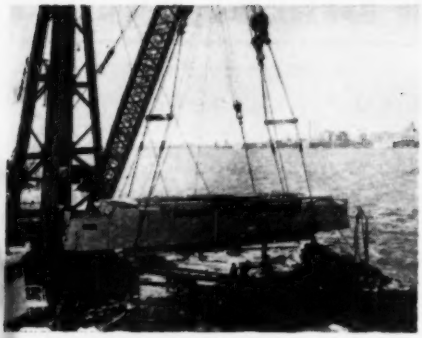
Starting with an electric-light bulb IGE has spread throughout the world until its impact is felt wherever electricity is available

THOMAS A. EDISON—a name long famous in the industrial history of the United States and a name that may well be remembered whenever we reach out and click on the lights.

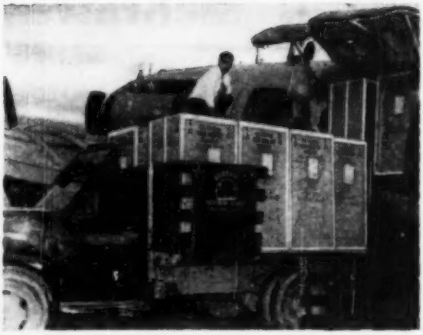
It was in 1879 that Thomas A. Edison's "bottle of light" sparked the electrical industry. And along with the carbon arc lamps developed about the same time by Thomson and Houston, Edison's first crude incandescent lamp laid the scientific foundation for the growth of America's oldest electrical manufacturer, the General Electric Co., and its foreign-business subsidiary, International General Electric Co.

It's a far cry from the incandescent or carbon-arc lamp of that day to the giant electrical machines that today make of electricity a symbol of progress both here and abroad. It is these machines that every day leave the ports of the U. S. to fill the electrical needs of the world—generating and using the electricity that drives industry.

The cargo may be a 40,000-kw. turbine-generator set on its way to Tel Aviv or six streamlined electric locomotives for the Cia. Paulista de Estradas de Ferro of Brazil or crates of fluorescent lamps to light a factory in Egypt. It may be any one of the

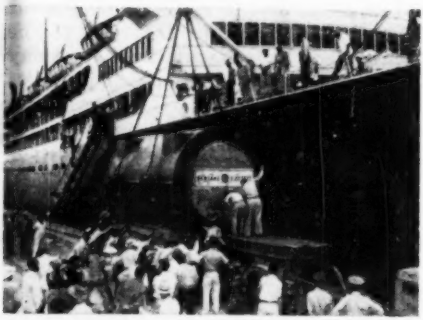


LARGEST electric locomotive built for export is on its way to Brazil.



REFRIGERATORS are assured prompt delivery by air express in Medellin, Colombia.

SWITCHING LOCOMOTIVE moves freight cars on the Paulista Railway, Brazil.



HUGE STATOR for steam turbine generator is unloaded at Caracas, Venezuela.

200,000 products manufactured by General Electric's more than 130 factories in the U. S.

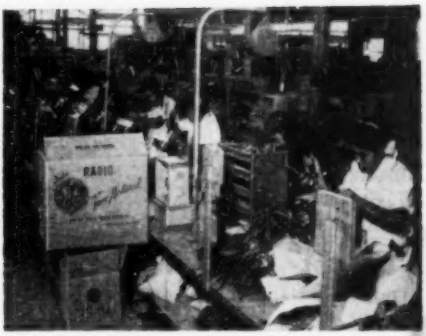
Where IGE Goes

In the last few months, for example, International General Electric has:

- Sent to Cuba two 5-kw. television transmitters.
- Sent to the Bokaro Steam Plant of India's Damodar Valley development project, a 50,000-kw. steam turbine-generator set, the third of three.
- Sold to Brazil a multi-channel microwave communications system that will revolutionize radio, teletype, and voice traffic between Rio de Janeiro and Sao Paulo.
- Sent to the Kingdom of Yemen a 25-w. short-wave transmitter. With it, the Yemen government will communicate with its United Nations' delegation in New York. The 150-kw. generator for powering the transmitter will be the largest power source in the country.
- Shipped to Uruguay the first three of 26 diesel electric locomotives.

General Electric is no newcomer to world business. Only 3 years after the first incandescent lamp proved successful, Thomas Edison founded the Eng-

AT DEPARTMENT STORE in Venezuela, customers examine GE appliances.



AT FACTORY in Mexico, workers assemble radios by mass-production methods.

lish Edison Electric Light Co. Two years later the Thomson-Houston International Co. was organized and, in 1885, its arc-lighting system was demonstrated at the Inventions Exhibition in London.

Other ventures abroad thrived in England, France, and South America. In 1885, a plant of bipolar generators was installed in the Argentine. A direct-current steam plant was built in Porto Alegro, Brazil, in 1888, and across the Andes in Santiago, Edison generators made their first appearance in 1890. In 1889, a representative of Edison went to Brazil, and 2 years later the first electric tramway system was inaugurated in Rio de Janeiro.

How IGE Was Formed

Soon after, in 1892, the Edison and Thomson-Houston companies combined to form the General Electric Co. Foreign activities, collected in a single department, grew in size and scope until IGE was formed in 1919 not only to handle its export business from the U. S. but also to organize and operate manufacturing and merchandising ventures in foreign countries.

From the beginning, the overseas activities of GE were built on more than the promotion and sale abroad of American-made products. Tariffs, local conditions and standards, and long shipments led GE to find other means of participating in overseas markets. So GE turned to manufacturing and assembly in foreign countries and invested in factories in Argentina, Brazil, Mexico, South Africa, Turkey, Uruguay, and many other countries.

From these plants come, for example, refrigerators in Montevideo, washing machines in Mexico City, motors in Santo Andre, and countless other products made to GE blueprints. Add to these many items the 200,000 manufactured in the U. S. and sold world wide and you begin to understand the part played by GE in its share of "powering" industry and the home.

That number alone—200,000 separate products—is hard to picture. They cannot be found in any one catalog. They range from shelf goods, such as clocks and toasters, to steam turbines, aircraft gas turbines, huge generators and motors, even locomotives. Many products—radios, toasters, other appliances, small motors, transformers—are

FRONT COVER—A 40,000-kva. generator is ready for installation in Finnish power plant.

designed and manufactured specifically for export because of the weather and current-supply conditions under which they have to operate.

Brazil—A Case Study

For a pattern of IGE operations abroad, let's look at what it has done in Brazil.

The manufacture of GE products began in Brazil 31 years ago. Lamps were assembled from parts imported from the U. S. Gradually, however, IGE's wholly owned subsidiary, General Electric, S. A., Brazil, switched to locally produced parts.

GESA cooperated with Brazilian producers to develop acetone, commercial acids, borax, waxes, dolemite, and oxides of lead, copper and magnesium sufficiently pure and uniform to be used in Fabrica Mazda's production. The company's operations have expanded to include transformers, motors, watthour meters, and other standard devices.

Early this year, GESA will offer electric refrigerators built at its World War II factory in Santo Andre, near Sao Paulo. The refrigerators will include sealed freezing units from the U. S., but as soon as possible this unit also will be manufactured in Brazil. Since 1945, IGE has spent many million dollars for additional plants and equipment in Brazil and expects to spend a like amount in the next 12 months. To man these plants, GESA employs some 4,000 Brazilian workers.

FREIGHT TRAIN, hauled by GE electric locomotive, meets schedule in Brazil.

The sale of the company's Brazilian-made goods increased sevenfold in the last 10 years. At the same time, the sale of goods shipped from the U. S. increased five times. This points out the double advantage to the U. S. domestic company from its overseas manufacturing—it actually amounts to a kind of "pump-priming". And the foreign buyer has available for his selection a greater variety of goods and a dependable supply source.

Stimulates Local Industry

Over and above these advantages to the foreign buyer is the stimulating effect that local manufacture has on local industry. A recent example of how IGE manufacturing encourages local industries is shown by the furniture business in Mexico. To house increasing imports of radio and television chassis, Mexican manufacturers are turning to mass-production methods. Last year, Industria Mueblera (Industrial Furniture), S. A., Mexico City, turned out 45,000 cabinets for radios and television sets of several U. S. manufacturers. In 1948, this company's production rate was 10,000 units yearly.

In addition to expanding its investments in sub-companies, IGE's efforts are pointed toward maintaining adequate facilities abroad to service exports that originated in orders placed in the U. S.

Training local personnel to perform these servicing functions is a steady activity of the company. Promising young engineers are given free instruc-

tion in several countries, and some men are even sent to GE factories in the U. S. for advanced engineering training.

Nearly 2,000 engineers from over 60 countries have been graduated from GE's student engineering course alone. These engineers, when they return to their own countries, carry with them not only knowledge of GE products but more importantly the philosophy of modern U. S. manufacturing methods.

These are the engineers that help staff IGE manufacturing plants and selling subsidiaries. All together, IGE employs 12,000 foreign nationals and extends to them many of the same advanced management practices and benefits that GE workers have in the U. S.

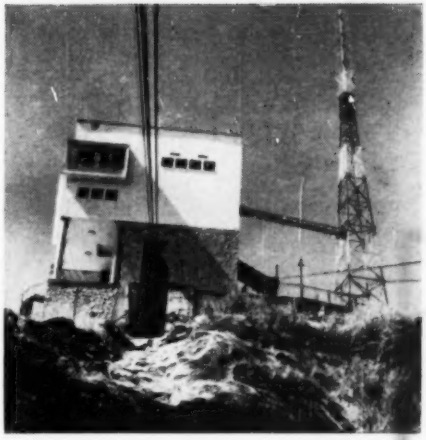
Among the employee-relations features offered in the overseas plants are suggestion systems with cash prizes, plant restaurants, libraries, training classes in first aid, and apprenticeship training courses leading to upgrading of junior employees.

Experienced Management

Working with these 12,000 foreign nationals are experienced managers, engineers, and other workers from the U. S. As the success of the enterprises and their continued operation depend to a large extent on the quality of particularly the plant and office managers, IGE stresses their selection and training.

Here is a case example: The district manager of the Caracas, Venezuela, office was transferred to the Paris office to bring him into contact with new problems and different aspects of the business. From Paris he was sent to the Harvard Business School and finally to Cuba to take over as the new head of General Electric Cubana, S. A.

Like other American companies expanding their operations abroad, IGE does so because its management believes there exists a real need for its products



TV TRANSMITTER antenna is located atop Sugar Loaf in Rio de Janeiro.

and technical knowledge. The basic assumptions on which it operates were recently expressed by an IGE executive as:

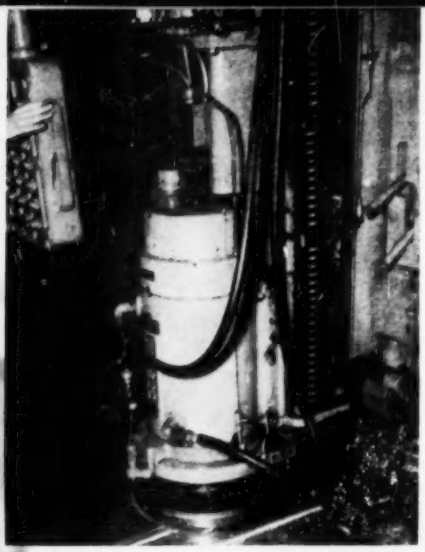
- That world manufacturing will continue to increase more rapidly than world trade and will become progressively more widespread.
- That such trends will involve continuing developments in the use of electricity, and that significant developments will continue to come from abroad, as well as from the U. S.
- That the U. S. Government will be sympathetic to, and encourage and assist in some instances, the hopes of less advanced countries to industrialize.

"The basic fact today," this executive said, "is that in every area in which IGE operates there is a crying need for power. Six years after the war there are blackouts, rationing, and prohibitions against current-consuming devices on the power lines."

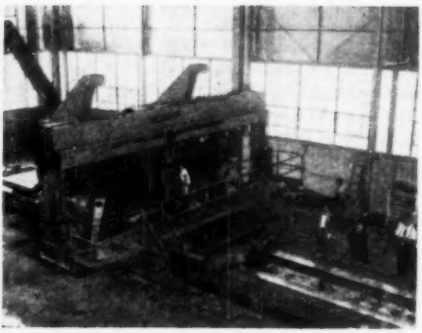
So long as there is such a need for power and for the machinery and know-how to create it and for the products to consume it, IGE will be in buisness.

Giants Make . . .

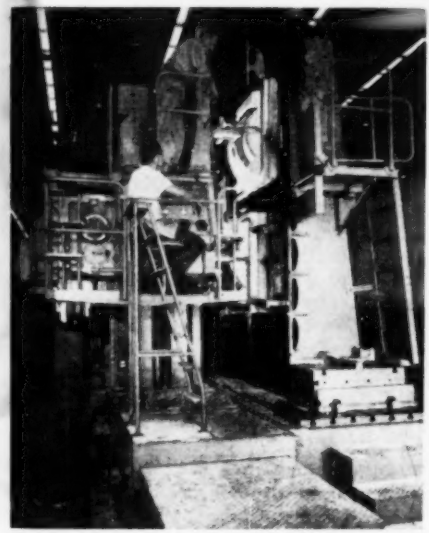
A mighty fabrication facility is being completed by Lockheed Aircraft Corp. It is Lockheed's "Hall of Giants". In it are special manufacturing "heavies" prompted by the trend in aircraft design resulting from high Mach numbers anticipated. Strong, relatively thin structures required would not lend



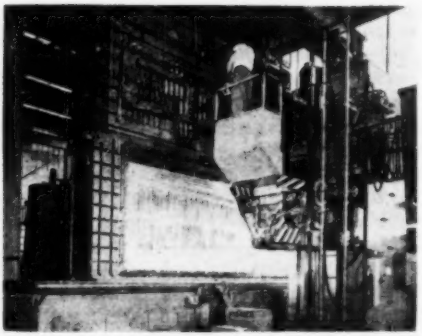
CUTTING HEADS of Giddings & Lewis skin mill spew out chips at rate of 2-3 barrels a min. Conveyor belt system carries chips from machine and dumps them.



SKIN MILL mills and profiles sheet 10 ft. wide by 32 ft. long (McG-H Digest, Dec '51, p24). Mill operates in three dimensions with two feed motions. Vacuum holds work.



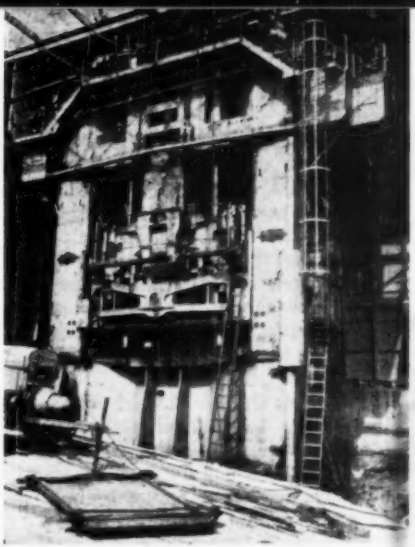
KELLER DUPLICATING MACHINE manufactures dies from steel or Kirksite (lead-zinc alloy). Contour required is produced from a model. Grinding is eliminated.



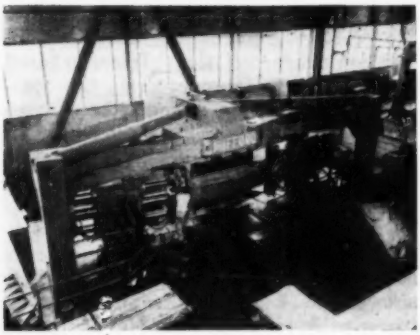
HYDROTEL, made by Cincinnati Milling Machine Co., has vertical angle plate 12 ft. high by 167 in. long. Machine cuts leading edge panel (bottom) from pattern.

. . . Jet Aircraft

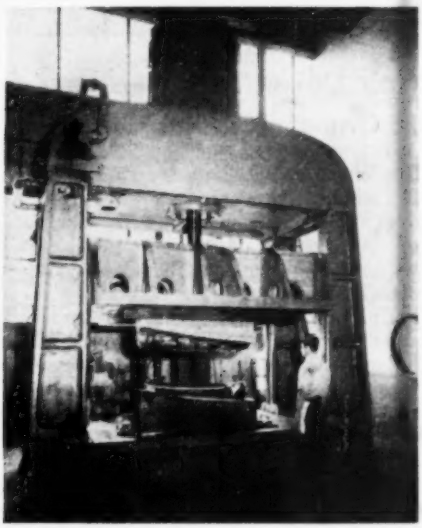
themselves to the conventional built-up-assembly scheme. Machines were needed that would produce long stretches of integrally stiffened skin, tapered shapes, and "sculptured" plate stock. And these sheets would have to be formed to some extent. Machines for the jobs are shown here.—Aviation Wk, Dec 3, p20



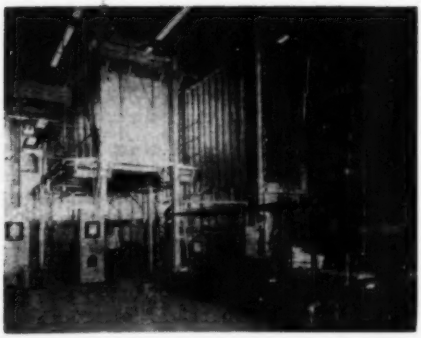
DRAWING OPERATIONS are done on 8,000-ton Birdsboro triple-action hydraulic draw press. (McG-H Digest, Aug '50, p40). It can form large sections of skin.



STRETCH-WRAP GIANT is 200-ton Hufford. It stretch-forms large contoured skin panels and long contoured extrusions. It handles 24-ft. by 8-sq. in. extrusion.



FOR IMPACT FORMING, the "Hall" has a 20-ton Chambersburg Ceco drop hammer (ram will lift a 20-ton die). Capacity is double that of previous largest stamp.



TREATING EQUIPMENT includes huge trichlorethylene degreaser, oven, and quench tank. Latter installation reaches from deep below floor level to roof height.

The Grinding Wheel

This book called "The Grinding Wheel" should be considered primarily as a textbook as it certainly is not for the expert in grinding. But it is more than that alone because its range is so broad that management men in metalworking will find it chock full of ideas for them.

It covers the whole field of grinding—from the abrasive that goes into the wheel to tricky jobs like grinding magnesium and titanium or how to design for grinding or how to estimate grinding costs.

The book (409 pages and priced at $3.50 a copy) was sponsored and is being sold by The Grinding Wheel Institute, 2130 Keith Building, Cleveland 15, Ohio.

New Device Stretches Speech to One-Half Usual Speed

Speech stretcher does for the ear what the slow-motion camera does for the eye. Electronic circuits slow the rate of occurrence of speech to one-half without making it difficult to understand.

Speech is first recorded at half speed on either tape or disk. This halves the frequencies. Bandpass filters followed by frequency doublers restore the intelligence so the speech can be understood while keeping the rate at one-half that of the original sound. Speech from the stretcher, which is made by Kay Electric Co., sounds nearly like the original speech except that every word lasts twice as long.

Most obvious use of the instrument is for language study. It can aid transcribing dialects or unwritten languages to standard phonetic symbols. It also permits a stenographer to type recorded dictation faster as the slower speech can be followed without repeating the material.

In advertising, the unusual speech might attract added attention to a radio or television commercial.—Electronics, Dec, p94

Heat-Retardant Coatings

Heat-retardant coatings—as opposed to fire or flame retardants—have heat-insulation characteristics. When exposed to 350–500° F. temperatures, the coatings puff up into a sponge-like carbonaceous mat—as much as 50 times its original thickness. This mat, or blanket, has high insulating value and thus retards the heat input into the surface to be protected.

Carbide & Carbon Chemicals Co., recently tested the coatings. The tests showed: (1) heat-retardant coatings increase fire resistance of all types of steel surfaces and extend their fire-safe period; (2) combustible wood surfaces are well protected; (3) extensions of fire-safe periods are long enough to bring fire-extinguishing systems and equipment into action before serious damage occurs.—Factory, Nov, p100

Tells Pilot His Location

Collins Radio, Inc., and Maryland Electronic Mfg. Co. are making radio range and marker voice identifiers. The identifiers supplement standard dot-dash-dot code system.

The voice tells the pilot what range or marker he is tuned to. This helps eliminate the danger of misidentification of station. Voice identification cycle takes 1 to 2 sec. Other comment also can be transmitted.—Aviation Wk, Dec 3, p78

Stainless-Steel Powder Makes Mechanical Parts

At last a Type 416 stainless-steel powder is being made that can be fabricated into parts by powder metallurgy. It can be pressed and sintered at practical pressures and temperature.

The powder is made at Vanadium Alloy Steel Co. by water-jet disintegration of molten stainless steel with subsequent dewatering and screening. Particle composition is identical with composition of the melted steel. Shape and size of particles can be controlled by adjusting the jet stream.

An outstanding property of parts made of powdered stainless steel is their resistance to wear and to seizing and galling. As parts can be varied in hardness and density over a wide range, parts of different hardness can be run together. Production rate of parts ranges from 300 to 1,000 pieces per hr., depending on size and shape.

Major uses of powdered stainless-steel parts have been for gear-train driving arms for water meters; sleeve bearings and bushings in meters that measure corrosive liquids; fishing-rod guides; and small gears, cams, levers.—Prod Eng, Dec, p168

Gage Measures Tubing Wall

Precision electronic gage to measure the exact wall thicknesses and concentricity of tubing was developed by Fairchild Aircraft Co. Straight and tapering tubes can be checked with equal ease.

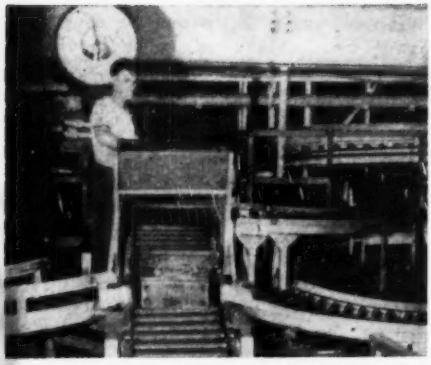
The gage consists of two horizontal arms mounted on a base. Wiring attaches contact points on the arms to an electronic 100-volt control box with transformer, amplifier, relay, and light for visual indication.

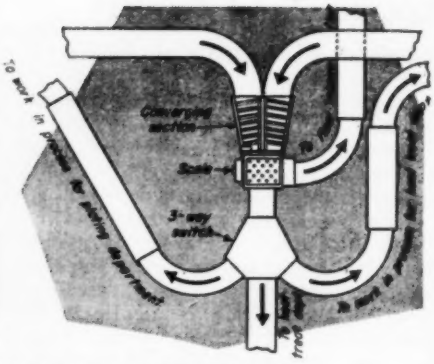
In operation, the test specimen is slipped over the lower arm of the gage and cradled on V-blocks. A screw adjustment zeroes the arm until a contact point touches the inside wall of the tubing. A vernier depth micrometer, on the end of the upper arm, is screwed down until it touches the outer surface of the test tubing.

While an electric current is sent through the arms, completing the circuit at the contact points, two readings of the vernier are taken; one with the tubing in place, the second with it removed and the vernier touching the lower contact point. The difference between the two readings is actual wall thickness, accurate to 0.001 in.—Auto Ind, Dec 15, p41

TRANSPARENT REINFORCED PLASTIC

Exeperimentation by Corrulux Corp. has resulted in the development of Duralux, an almost-transparent reinforced plastic material that will transmit 75-90% visual light transmitted by air. Plastic can be sawed and drilled with standard tools. In the picture, a 25-cal. bullet makes a clean round hole in the plastic sheet, and a fast-pitched stone produces a local surface fracture, but does not break it. Glass is smashed by either attack.—Mod Plastics, Dec, p98





ONE STATION CONTROLS PLANT CONVEYOR SYSTEM

Conveyor system at new Shakeproof, Inc., plant moves 500,000 different items through seven major plant departments. Completed parts in tote pans go to "brain platform" for rerouting. Two incoming and four outgoing conveyor lines meet at this control center. Operator weighs each pan load and routes to outgoing line according to production-control schedule. Lines lead to storage for plating, storage for heat treating, direct to heat treating, and to final inspection. Switch directing pans to proper conveyor is three-way radial roller type. "Brain" control permits full conveyorization, yet retains flexible routing.—Am Mach, Nov 26, p130

Blowing Vermiculite Mix Insulates Furnace Walls

Furnace insulation at Qurora Gasoline Co. is blown by air into place. Advantages: fast, simple, low in cost. Applications include lining of a vacuum unit heater, charge heater, visbreaker furnace, and a new Platforming unit.

Qurora lines furnaces with a insulating mix consisting of a lightweight vermiculite aggregate, a medium-weight clay aggregate, and a high-temperature cement.

Furnace walls are prepared by welding studs at 2-ft. intervals, attaching corrugated 9-gage wire mesh over the studs, and blowing the mix into place before tubes are installed. Areas where direct application is impossible are lined with panels blown or cast in forms.

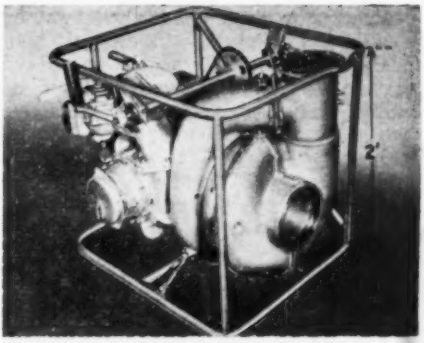
Expansion joints are placed at every 8 ft. in large blown surfaces. A closed metal lath is covered with a plastic mineral-wool cement and attached to furnace wall. Normally, a ½-in. layer of insulation is laid over the ridge of expansion joints to protect the lath from damage by heat.—Oil & Gas J, Nov 22, p60

Troughs Are Easily Emptied

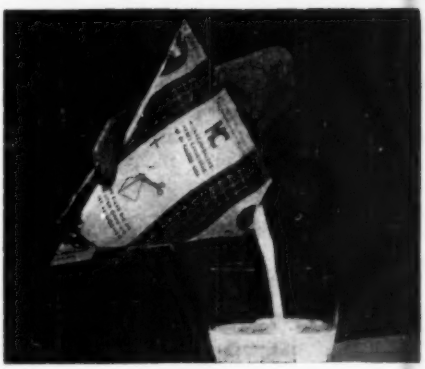
Portable chip troughs help keep Armature and Electric Machine Co.'s repair division clean and orderly. They are rectangular wood troughs mounted on four legs, two of which are castered. A large handle, made from a piece of electrical conduit, is attached to the trough sides.

Troughs fit snugly under lathe beds. When full, they are easily pulled out and pushed, wheelbarrow fashion, to a large chip barrel for emptying. They can be lined with sheet metal if work is flooded with cutting fluid.—Elec C&M, Dec, p71

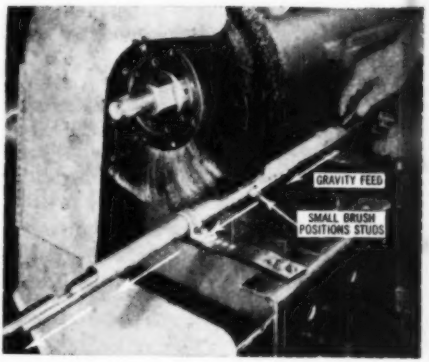
This Month's How To . . .



. . . **reduce size and weight** of portable fire pump was answered to U. S. Navy's satisfaction by Solar Aircraft Co.'s gas-turbine-powered unit. Pump rating is 500 gal. per min. at 100-psi. discharge pressure and 16-ft. suction lift. Turbine top speed is 40,300 rpm., which is reduced to pump speed of 4,428 rpm. by bevel gear and pinion. Turbine combustion chamber, located between compressor scroll outlet and turbine inlet, is elbow-shaped to save space. Power rating is 47 hp. Dry weight is 165 lb. —Prod. Eng, Dec, p140



. . . **package fluids** and save 65% of the paper is the story from Sweden. The process, announced by Ab. Tetra Pak of Lund, Sweden, offers a new design concept for paper cartons. Container is in shape of tetrahedron—a four-sided pyramid. Special machine at bottler's plant forms cartons from kraft paper roll, fills them, and heat-seals them. Cartons then are separated by cutter and packed automatically in hexagonal shipping containers. Carton shape saves up to 75% space in shipping and handling.—Paper Ind, Nov, p911



. . . **remove burrs and sharp edges** from the threads of studs is [illegible]ed by a power brush. Studs are fed [illegible] an inclined pipe that carries them to the brush by gravity. A cutaway section of the pipe exposes the studs to the brush. A small end brush positions the studs for brushing. The pipe guides the finished studs by gravity to a container. This is one job brushes can do. Others include: stripping wire insulation, cleaning chain conveyor, preparing for plating, making concrete pipe, and deburring inside diameters.—**Factory, Dec, p76**

Increase Production of West Hemisphere Diamonds

Vast reserves of diamonds exist in the Western Hemisphere, but they are still in the ground. The small output of western diamonds is largely caused by manual labor expended in primitive operations that depend wholly on chance.

What is needed is first, a systematic and careful exploration of areas where diamonds are being mined by hand methods. The aim would be to turn up ground too low-grade to work by hand but high enough in grade to support a mechanized operation. Second, mechanized, high-capacity methods must be applied to such deposits.

Problems in mining diamonds are generally the same as those in any other type of alluvial mining. The approach does require a special focus, however, in the very small size, very great value, and only moderately high specific gravity of the diamond product sought.

Profitable diamond gravel would run something like this: If the gravel weighs 125 lb. per cu. ft., and if the gravel has, as it should, about 0.5 carat per cu. m., the ratio of diamonds to gravel will be about 1 to 20 million by weight.

Various jigs eliminate most of the hand labor required and, at the same time, recover as much as 40% more diamonds than do hand methods.—Eng & Min J, Dec, p90

IN THIS ISSUE

A method that speeds, improves X-ray inspection by

XERORADIOGRAPHY

New X-ray inspection method requires no wet processing or chemical solutions to develop the X-ray images. Prints can be made immediately after exposure. And tests indicate that internal details are more clearly defined with Xeroradiography. The article begins on page 54.

Cuts Router Manhours

Less machine time per operation and longer cutting life are dividends from simple pressure-oiler attachment for a tilt-table router. Texas Engineering & Manufacturing Co., Inc., reports that this attachment has cut manhour router time by 12½% and raised cutter life 100%.

A 1-qt. container with oil adjustment valve is connected to a piece of tubing leading to the router head. Pressure is supplied by a compressed air line hooked to a regulator and an automatic cutoff valve.—Aviation Wk, Dec 10, p47

World Business Briefs

• **India will get** three big oil refineries built by Standard Vacuum, Caltex, and Burmah Shell at a cost of $30-million apiece. Stanvac and Burmah have completed site surveys in the Bombay harbor area; Caltex is considering Madras for its refinery.—Business Wk, Dec 1, p154

• **In Brazil,** the ports of Santos and Rio de Janeiro are due for an $89-million construction program to include new piers, silos, warehouses, cranes, and equipment. . . . President Vargas has signed a law boosting personal and corporate income taxes 15%. Expected yield is $100-million yearly; most of it will help pay for a 5-year economic development program.—Business Wk, Dec 8, p182

• **Australia will desocialize** its coal industry. As a starter, the federal gov-

EXCELLENT VISIBILITY all around through huge window area; clean, simple lines; easy parking; smooth, quiet ride; good acceleration are some of the features of . . .

ernment will sell to private colliery owners $70-million worth of machinery and equipment belonging to the Joint Coal Board. Government hopes that private business will invest $175-million to modernize and develop mines in New South Wales and Queensland.—Business Wk, Dec 15, p154

Centrifugal-Pump Drive

An unusual mechanical feature of a new gasoline plant owned by Standard Oil Co. of Texas is its driving of centrifugal cooling-water circulating pumps by automotive-type engines. These internal-combustion engines run at 1,400 rpm. and deliver 15 bhp. They operate on plant residue gas as the fuel.

Excess equipment has been stripped from engines. Fans, for instance, have been removed because all cooling is done in a central system.

Service has been satisfactory.—Oil & Gas J, Nov 29, p108

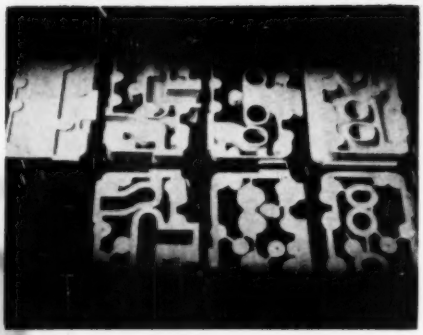
Willys New Passenger Car

Two new passenger cars, Aero Wing and Aero Ace, have been introduced by Willys Overland Corp. Powered by a 6-cylinder, F-head engine, the cars are reported to get 35 mi. per gal. at 30 mi. per hr. with overdrive.

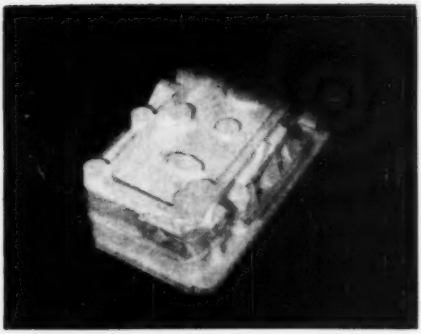
Power is taken from the engine through a newly designed clutch having almost frictionless linkage. It gives a smooth, light operation to the three-speed synchro-mesh transmission.

There is no separate chassis. Welded integral construction makes body and frame a single unit. Suspension is independent with coil springs in the front and semi-elliptic springs in the rear. Rubber-mounted shackles completely insulate the rear springs from the car. Rubber also insulates the front suspension from the body. Road noise level is exceptionally low.

For export, right-hand drive and a more economical 4-cylinder engine will be available.—Am Auto, Jan, p34



Cylinder-head slices (top) and brazing gaskets (bottom) make up this . . .



. . . Assembly that is ready for the furnace-brazing operation

Method Forms Aluminum Heads

Furnace brazing of individual permanent-molded sections permits economical production of light-alloy cylinder heads and blocks

A NEW METHOD of making aluminum cylinder heads, cylinder blocks, and similar products difficult to produce economically by conventional casting methods has been developed by the Aluminum Co. of America.

In this process, aluminum alloys are utilized in several forms, and recent improvements in brazing alloys and techniques are adapted to hold the finished sandwich-like product together. Parts formerly calling for intricate sand cores now can be produced by a combination permanent-mold and furnace-brazing process.

Aluminum cylinder heads have been cast by the permanent-mold process in two or more integral sections, and the sections or slices are furnace-brazed together for final assembly. The standard design of an ordinary cylinder head must be altered slightly to permit the individual sectional casting of each slice. The permanent-mold casting process, well suited to mass-production techniques, eliminates the necessity of cores normally employed during the production of a one-piece, semipermanent-mold or sand cast product.

Sectional slices of the aluminum cylinder head illustrated were cast in C612 alloy—a high-strength, nonheat-treatable aluminum permanent-mold casting alloy. In addition, the alloy has excellent brazing characteristics, good resistance to corrosion, and a relatively high melting range of 1120-1190° F.

The filler material for joining the component parts of the cylinder head was carefully considered. Extensive testing revealed that a suitable brazing material in thin sheet form stamped to the outline of the exposed joining surfaces of each cast section would be ideal. The material selected was Alcoa brazing alloy 718.

Thickness of the brazing gasket depends on the size of the unit involved and the strength required in the joint. Sufficient metal was added by using the

thin aluminum gaskets to form fillets and completely seal the unit without filling the interpassages. Alcoa No. 33 Brazing Flux permitted the filler metal to wet completely the exposed joining surfaces of the cylinder-head sections.

The cylinder-head slices and the filler-metal gaskets were prepared for brazing by a cleansing with a mild caustic etch followed by a cold-water rinse, a nitric acid dip and a final rinse in hot water.

The parts were then fluxed and assembled with the correct brazing sheet gasket placed between slices. Pins held the assembly in alignment during brazing. To control the assembly's final dimensions, washers between the parts maintained the required separation.

An electrically heated furnace brazed the assembly at 1085° F. After brazing, the cylinder head was removed from the furnace, cooled in air to 900° F., and then quenched in 180° F. water.

Laboratory tests showed the joints to have 75% of the tensile strength of the parent metal, and 70% of its fatigue strength. Dynamometer and road tests demonstrated no failures in the brazed joints or in the parent metal.

Under a mass-production setup, the sandwich design will prove to cost much less per piece than conventional sand or semipermanent-mold cast units. Final cost will approach that of similar cast-iron units.—Auto Ind, Dec 15, p34

Combination Is Dangerous

A two-way radio-equipped vehicle transporting dynamite and detonator caps of the type wired for electric detonation recently exploded. Cause of the explosion: wires attached to the detonator caps formed a resonant circuit for the frequency of the transmitter. The wires absorbed enough energy to explode the caps, which in turn exploded the dynamite.—Const Meth & Equip, Dec, p59

MOBILE-RADIO vehicles are tagged in or out of service on annunciator board

Annunciator Tells Whether Vehicles Are Available

Dispatchers and supervisors at Indiana & Michigan Electric Co.'s operating headquarters can tell at a glance what vehicles equipped with mobile radios are doing. An annunciator shows this information and thus helps supervision of the vehicles and eliminates overcrowding of transmission channels when traffic is heavy.

The annunciator is controlled by banks of toggle switches. The dispatcher "posts" any mobile-radio unit when its operator reports as "in service" or "out of service".

Each vehicle is identified by number on the board. Operator's name also is given, and space at the left of the signal lamp may be used to show the type of vehicle and the work it is doing. Identification labels can be easily changed when necessary.

The annunciator keeps no record of the vehicle's locations. Such information is shown by log entries or order copies.—Elec World, Nov 19, p128

TECHNICAL SHORTS

Longer Die Life—Five-year study made by Dreis & Krump Mfg. Co. indicates that induction-hardened press-brake dies last 10 to 20 times longer than dies heat-treated by conventional methods. Superior performance is due to close control of both degree and depth of hardness.—Iron Age, Nov 1, p159

Takes 100,000 Frames/Sec.—Introduced by Battelle Memorial Institute, a new camera offers more precise resolution of high-speed phenomena. It will take 100,000 frames/sec. and resolves 30-40 lines per mm. on 8-mm. film.—Aviation Wk, Dec 10, p25

Teflon-coated Bread Pans—Still in the experimental stage is a promising new method to eliminate bread-pan greasing. A 0.001-in. film of Teflon is sprayed on inside of pans. Treated pans have been used 200 times without recoating or greasing.—Food Eng, Nov, p187

World's Biggest Dragline—A 282-ft. boom fabricated by welding tubular sections made of special alloy steel and a 22-ton bucket holding 27 tons are features of Stewart & Lloyd's dragline in England. Dumping radius is 260 ft. and machine can dig 1,600 tons per hr.—Eng & Min J, Dec, p100

New Rayon Finish—Dan River Mills, Inc., has developed a chemical process that gives rayon fabrics dimensional stability, crush resistance, and non-affinity for free chlorine and acid bleaches. The process promises at least to double the flex life of rayon fabrics. It is applied after piece dyeing.—Textile World, Dec, p248

Traveling Plant—Los Angeles Dept. of Water & Power faced trouble in getting aggregate for concrete while building a 260-mi. transmission line. So it bought a portable aggregate plant and set it up at pits along the right-of-way.—Elec West, Nov, p81

WIRES IDENTIFY REPAIRMAN

Sunnyhill Coal Co. supplies each of eight mechanics with short pieces of colored wire. The wires are used to tie into the off position the starter handle of the unit on which the mechanic is working. Since each man has a different color, it is unlikely that one mechanic will by mistake remove a wire another man has put on a starter.—Coal Age, Dec, p108

Tanker-turbine Success—World's first merchant ship powered by a gas turbine is on regular runs for Shell Oil. Turbine replaces one of four diesel-electric engines on the 12,000-ton tanker Auris. Turbine advantages are lower weight, less space needed, less risk of failure, and lower operating and maintenance costs.—Oil & Gas J, Nov 29, p64

Better Air—A 600-seat theater recently installed all-electric air cleaning and sterilizing. After air is cleaned in a Precipitron, it passes through duct in which six germicidal Sterilamps kill about 95% of all air-borne bacteria.—Elec C&M, Nov, p71

Match Multiple V-belts.—To get maximum power and uniform wear out of V-belts, they should be accurately machine-matched. Belts are subject to temperature and humidity changes that cause stretch or shrink. Different-length belts will cause power loss and premature wear.—Factory, Dec, p132

Now for Edible Oils—Solexol process, developed by M. W. Kellogg Co., separates constitutents of oil-bearing materials by treating them with liquid propane. A Norwegian firm has contracted with Kellogg for such a plant to decolorize and fractionate herring oil into both edible and industrial products.—Chem Eng, Dec, p232

Most Powerful Dredge Is Inland—World's biggest suction dredge has 10,950 diesel hp. driving electric generators that in turn drive every dredge operation through electric motors. Built in easily dismantled sections, dredge is working on the Missouri River in South Dakota.—Const Meth & Equip, Nov, p54

Insulates Aluminum Ladders—Aluminum ladders are easy to handle, shed no splinters, and last a long time. But they have one fault—aluminum is a good electrical conductor, which is a hazard for electrical maintenance men. So a handy trick is to insulate them by screwing wood extensions on the bottom of side members.—Power, Dec, p134

Better Piston Rings—Research has come up with two improved passenger-car piston rings. One is a chromium-plated, heat-treated steel ring made of specially rolled rectangular wire. Little machining is required. Other ring is made of powdered iron. Tests are underway.—Auto Ind, Nov 1, p106

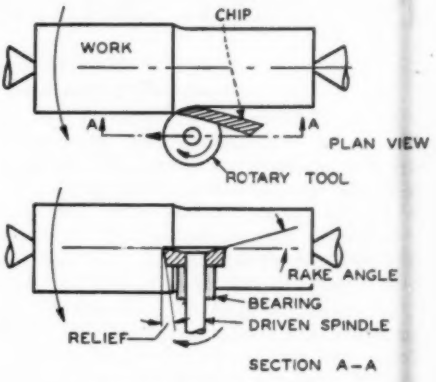
New Battery Separator—Dewey & Almy Chemical Co. is going after the battery-separator market with a separator made of paper impregnated with rubber. It is claimed to be better than wood separators and cheaper than plastic, hard-rubber or glass-fiber separators.—Chem Wk, Oct 20, p7

Cheaper Germanium—New process produces germanium crystals for rectifiers and amplifiers by reducing germanium dioxide in hydrogen atmosphere at 700° C., adding 1% of tin and 0.1% of additional dioxide, and heating in furnace to 1,000° C. Sylvania Electric Products, Inc., owns patent rights.—Prod Eng, Nov, p201

To Come for Cars—Safer automobiles through radar and electronic equipment are envisioned by the Ford Motor Co. Radar control will automatically dim an approaching car's high beams if the driver forgets. The electronic unit automatically applies brakes when collision is imminent.—Business Wk, Dec 8, p134

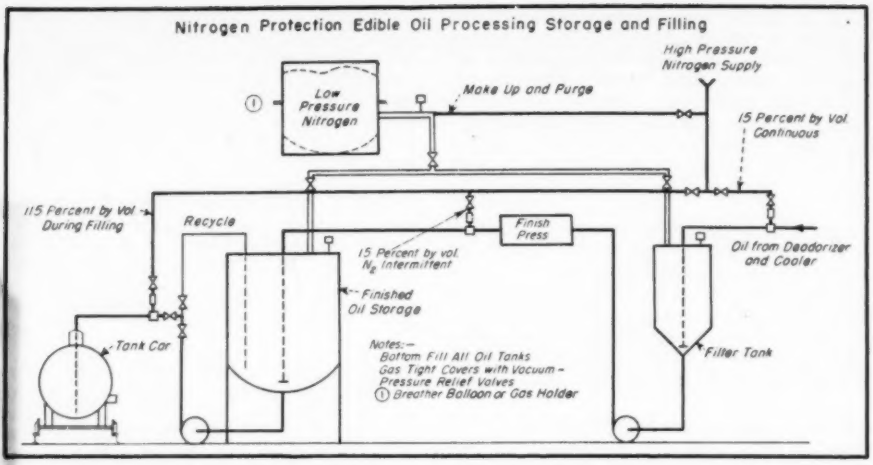
To Save $100-million—That is the estimated saving that will come from a DDT spray job of a 250-sq. mi. tract of Canadian timber to kill spruce budworms. Two-million cords of pulpwood will be saved from the ravages of the worm.—Paper Ind, Nov, p878

Jar Is Unbreakable—Double-wall polyethylene jar design, patented by Injection Molding Co., is five times lighter than glass jars of similar size. Double-wall construction provides insulation and prevents the bleeding of essential oils that often occurs in single-wall polyethylene containers.—Mod Plastics, Dec, p206



ROTARY LATHE TOOL

Novel cutting tool in form of a disk that can be rotated has been developed at Massachusetts Institute of Technology. Advantages: greater effective rake angle with no decrease in actual included angle of tool; rest period for cutting edge, thereby cooling edge; positive means of introducing coolant; greater relative chip velocity and lower coefficient of friction; lower power needed; good tool life.—Am Mach, Nov 26, p145


Nitrogen Protection Edible Oil Processing Storage and Filling
High Pressure Nitrogen Supply
Low Pressure Nitrogen
Make Up and Purge
15 Percent by Vol. Continuous
115 Percent by Vol. During Filling
Recycle
Finish Press
15 Percent by vol. N_2 Intermittent
Oil from Deodorizer and Cooler
Finished Oil Storage
Tank Car
Notes:—
Bottom Fill All Oil Tanks
Gas Tight Covers with Vacuum-Pressure Relief Valves
① Breather Balloon or Gas Holder
Filter Tank

***FLOW DIAGRAM** shows how both high-pressure and low-pressure nitrogen are applied to protect edible oils from oxidation during processing, storage, and shipping by tank car*

Nitrogen Guards Food Quality

Protection of foods by nitrogen is not new, but development work is constantly making it more valuable in processing and packaging

NITROGEN PACKAGING and processing are increasingly recognized in the food industry as successful methods to:

- Keep foods fresher.
- Retain better appearance.
- Prevent off-flavors.
- Avoid vitamin loss.

Nitrogen safeguards food quality by preventing harmful oxidation of such foods as: edible oils, shortening, margarine, coffee, dried milk, yeast, nut meats, citrus juices, mayonnaise, dried beef, other meats, cherries, jelly, dehydrated potatoes, apple juice, powdered eggs, ice-cream mix, potato chips, other oil-fried products, soup mix, coconut, baby foods, wine, and cream.

Nitrogen packaging is done in several ways. One is first to evacuate the package and then to break back the vacuum with nitrogen. Effectiveness depends on how well oxygen is removed by vacuum and also on the purity of the nitrogen.

Another packaging method is to purge the air out of the top of the container with nitrogen. Headspace nitrogen-jet purging is similar to steam-jet purging. The nitrogen jet sweeps out the air and reduces oxygen content to about 1%. This concentration is satisfactory in canned or bottled products.

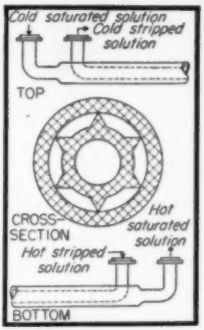
Another method is tandem purging. Nitrogen is flushed from one food container to another in a closed system. This method can be used for dry solids like nuts and potato chips if a vacuum system is not available.

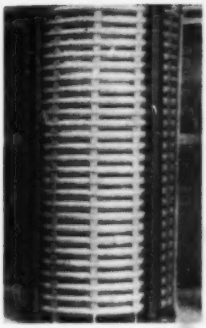
Oxygen in liquid foods can be removed by stripping with nitrogen.

Stripping is done in a vessel permitting counter-current flow. An advantage in nitrogen stripping of liquids such as fruit juices is that it removes practically no volatile materials, as compared to vacuum deaerating.

Nitrogen processing, such as protection of oils as illustrated, works on the principle of blanketing the food with nitrogen and so keeping oxygen from it. In this example, nitrogen is injected into the oil as it comes from the deodorizer and cooler. About 15% by volume of nitrogen is employed here.

The oil then goes into a closed filter tank. As this tank operates intermittently, the headspace is tied into the low-pressure nitrogen system to prevent drawing in air as oil is pumped out. When oil leaves the finish press, more nitrogen may be injected to saturate the oil thoroughly. As oil is pumped to tank car, still more nitrogen is injected to purge the car.—Food Eng, Dec, p72





NEW IN HEAT EXCHANGERS

Heat exchangers, employed by American Smelting & Refining Co. in refining impure surfur dioxide, consists of two lead coils—an extruded star-shaped 1-in. pipe inside a 2-in. pipe. Pipes after assembly are coiled into units 11 ft. in dia. and 7 ft. high. Each coil has 300 ft. of pipe. Solution processed is impure SO_2 in dimethylaniline, which releases pure SO_2 on heating.—Chem Eng, Nov, p161

Injection Machine Has Screw Pre-Plasticizer

Newest development of the Plastics Div., Jackson & Church Co., is a screw type 16-oz. horizontal injection molding press featuring J-C's Hendry preplasticizing process. Except for its preplasticizer assembly, mounted at right angles to the injection chamber, the machine is similar to standard horizontal types. But the Hendry pre-plasticizing process uses no torpedo in the injection chamber. The machine plasticizes the material and transfers it to the chamber, ready to be injected into the mold.

Extending from the hopper to the injection chamber is an extruder screw that operates at pre-adjusted speeds to mill the plastic material prior to injection. This results in thorough mixing and beating. Thus material is injected into the die at lower pressures and temperatures.

The pre-plasticizing chamber makes the machine particularly suited to the handling of flexible vinyl materials. The pre-milling feature also permits the unit to be used for dry coloring of styrene and other thermoplastic materials, and is important in reducing mold cycles.—Mod Plastic. Dec. p115

Chemical Controls Suckers

Ammonium sulfamate controls sucker growth from stumps along transmission and distribution lines of Northern States Power Co. The chemical is applied by laying powder in notches cut around the stump base, treating cut surface with liquid mixture, or encircling cut surface with thin layer of powder. Powder treatments are preferred. Root system of stump is effectively killed.—Elec World, Dec 3, p124

DOW agricultural chemicals

TESTED AND PROVED FOR MANY APPLICATIONS . . .

Dow agricultural chemicals have a long record of successful applications . . . in helping farmers raise more and better crops and livestock, in the fumigation of stored grains, and in farm maintenance.

Dow is a recognized leader in the farm field and has been developing, testing, and marketing both basic ingredients and finished products for farmers for nearly fifty years. The Dow line includes: weed and grass killers, insecticides, fungicides, soil

look to DOW for high quality chemicals

preservatives. Investigate these chemicals today. Contact our nearest sales representative or write to Dow direct.

Alkalies

Dow alkalies serve many varied industries. Caustic soda is used to manufacture soaps, synthetic detergents and cleaning compounds; in refining vegetable oils; in manufacturing rayon and other textiles, paper and petroleum products and in chemical processing. Other Dow chemicals of alkaline nature that find widespread use include caustic potash and sodium orthosilicate cleaning compound.

Plastics

Styron (Dow polystyrene) is a thermoplastic material increasingly used by manufacturers to bring added sales appeal and low production costs to such items as lighting fixtures, radio cabinets, and electric refrigerator parts. Other Dow plastics include: Ethocel (Dow ethylcellulose) a tough but light plastic; Saran for extruding and weaving into seat covers, screens; Saran film used for packaging.

Solvents

Dow is the source for a wide range of solvents. Due to their ability to quickly dissolve greases, fats and waxes, Dow chlorinated solvents are in wide demand in the metal working industries. In addition to this type, many other Dow chemicals have noteworthy solvent power. Among them are Dowanol glycol ethers, polyglycols and alkanolamines.

Dowicide® Products

Today, materials in process can be guarded against attacks of mold and bacteria by the use of Dowicide industrial germicides and fungicides. These preservatives protect materials against microorganism attacks in processing paper, textiles, leather, lumber, adhesives, petroleum and disinfectants.

For additional information about the more than 600 chemicals that Dow supplies to industry, contact our sales representative in your country or write to us care of Dept. EX-30.

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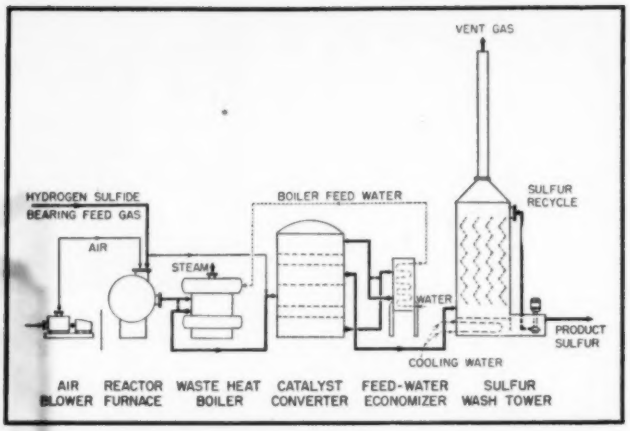
CHEMICALS



SULFUR RECOVERY

At Shell Oil Co. of Canada, Ltd.'s plant at Calgary, sulfur is extracted by the Mathieson process from waste acid gases from a natural-gas treating plant. Feed gas is burned in reactor, cooled in waste-heat boiler, passed through a catalyst converter to form sulfur, and contacted in wash tower with cool sulfur to condense out the sulfur content.—Oil & Gas J, Oct 25, p102

Four-Point Program Shows How To Cut Reject Costs

Build Employee Cooperation: A quality improvement committee is set up. General shop foremen are members. The program should be given plant-wide publicity. Posters describing the program are suggested; even a contest for a quality-improvement slogan may be held.

A team contest in reducing cost of rejects is organized; each team headed by a foreman. Prizes are given to the team with the best improvement in cost of rejects.

Train Key People: All shop supervisors and manufacturing engineers go through a training program. Classes demonstrate philosophy of quality control, its principles, and how to put these principles to work.

Improve Inspection Methods: First-piece and patrol inspection is recommended. First-piece inspection indicates whether or not quality is under control at the start. Patrol inspection shows how quality is holding up on a process.

Analyze Field Complaints: A complaint committee, with the quality-control man as chairman, is setup. Members represent engineering, sales, manufacturing, service, and construction departments. They investigate complaints and recommend corrective action—Factory, Dec, p74

Brass-Foundry Incentives

The Anglo-American Council on Productivity has just issued its longest report, The Brass Foundry. The 200-page document indicates that American brass founding is not highly mechanized and is actually behind British technical standards.

It reveals too that U. S. output per man-hour is far ahead of British output. The American foundryman works 7 hr. for a pair of shoes, the British 15; the American works 3 days for a suit, the British 3 weeks. The incentive systems in the U. S. make the difference.

An example: The report says, "Americans want no tea-breaks during the day and only half-an-hour for lunch. 'Why waste production time', they argue, 'When it is worth money to us?' Instead of canteens, slot machines are provided."—Am Mach, Oct 29, p141

New Engine Plant Features Nearly Automatic Operation

New DeSoto engine plant is nearly a "pushbutton" operation. It is considered to be more fully automatic than any other plant in the automobile industry.

All machining operations on the new V-8 engine block are performed on transfer machines, which average 84 ft. in length. Intake manifolds, bearing caps, cylinder heads, and chain case covers also are transfer-machined.

An unusual operation in the line is insertion of stations where plug gages check, not hole sizes, but whether or not operations have been done. This eliminates possibility of jamming machines.

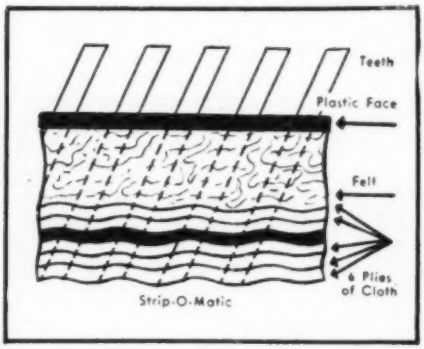
An unusual machine is the automatic crankshaft balancing unit. The operator loads the crankshaft into a fixture. The machine indicates if drilling is needed and the part is transferred to a press for drilling and then moved to a second balance where it is again tested. If the shaft needs further drilling, that also is done automatically.

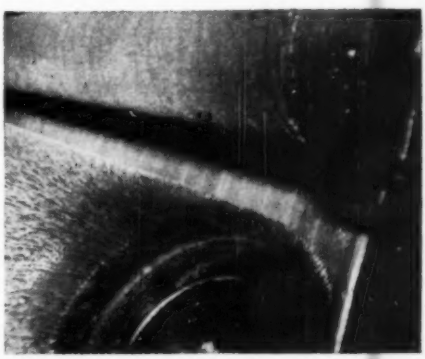
Other new machines weigh pistons and connecting rods, then mill enough material off them to equalize their weights.—Iron Age, Nov 29, p60

Jets Chase Fog Away

New radiant heating system designed to remove snow and ice from runways and disperse fog has been developed by American Hydrotherm Corp. By means of water at 300–400° F. and 250 psi. in pipes 6–8 in. below the runway surface, the system provides sufficient heat to keep the surface clear under the most adverse conditions of ice and snow.

Fog dispersal is achieved by ejecting air jets, heated by the underground hot-water pipes, onto the runway. Maximum height of effective fog dispersal with the system is 30 ft.—Aviation Wk, Dec 10, p63





STRIP-O-MATIC CLOTHING MADE FOR COTTON AND FINE WOOL

Strip-O-Matic clothing, a development of Benjamin Booth Co., permits carding virtually without stripping and is now available for use with cotton and finer counts of woolen and synthetic yarns. The 456-point size is equivalent to 480 points per sq. in. in conventional clothing. Open design of the teeth actually gives more points transversely, while it eliminates longitudinal points. Stripping is reduced by 50-500%. In carding nylon, rayon, and other fine synthetics, stripping is practically eliminated with natural fibers, runs are increased.—Textile World, Dec, p153

New Tool for Business

Input-output grid helps business to know demand, markets, effects of government on products, relative efficiency, when to expand

IN PREPARATION is a new tool for business research and policy making. This tool is the relatively new science of interindustry economics, better known as the input-output method.

The U. S. Bureau of Labor Statistics has published a small part of its interindustry data. Another instalment is due before June, and more is due still later on. Naturally the data will fit only U. S. business. But most countries can collect the necessary data and assemble it to fit input-output.

The method has possibilities for a businessman. It may tell him:

- Where the demand for his product ultimately lies; who can place orders that indirectly mean more business.
- How the demand for his product will be affected as economy changes.
- What new fields his products may enter.
- How his cost structure and efficiency compare with competitors.
- What effect government spending and controls will have on the demand for his products and on the cost of his materials.

Wassily Leontief, Harvard University economist, conceived the input-output method to give the organization to statistics necessary for answering these questions. Briefly this is Leontief's approach:

Given any economic event, the problem is to tell the effect of an industry on the nation as a whole. Any demand on the economy appears in the form of end-products: so many houses, so many machine guns, so many automobiles.

But many industries do not make end-products; they provide materials, components, or services to some other industry. Thus, it is hard to figure out how a particular kind of demand affects any particular industry.

The Input-Output Grid

To draw the answers out of statistics, Leontief devised the input-output grid, or chart. It sums up his statistical information about industry: the sources and amounts of materials; the destinations and volumes of products. It shows the relationship of each segment of the economy to every other segment.

Horizontal lines of the industrial grid show what happens to the output of each industry group. In the vertical columns, the sources of all the materials that each group buys can be found.

The grid helps in finding out how a change in one industry will affect all the other industries. The actual figures in the table will vary from year to year, but the proportions of one to another are fairly constant; the proportion of each industry's output that is bought by each other industry stays about the same over a short run. This constant ratio reflects the relatively constant technology of the industries and the buying habits of consumers. Thus only varying total quantities must be handled. This is where electronic computers, with their high speed, come in.

Electronic Brains

Leontief's work was limited to a 21-by-21 grid in two ways: (1) by lack of sufficiently detailed statistics, (2) by the sheer impossibility of the mathematics for a larger grid.

The Bureau of Labor Statistics has

licked the data problem. It has had 70 statisticians and economists at work for 3 years. And recent development of high-speed electronic computers has solved the mathematics problem.

These machines can predigest data so the businessman can solve his own problems from that point on. Predigesting requires the application of matrix algebra. The influence that all figures in a grid exert on any one figure need be calculated only once. When each figure is "treated" with all the others, the result is an entirely new grid called an inverse matrix.

From that inverse grid, with its algebra done by an electronic brain, the businessman could solve demand problems. Here is how he would do it:

He would first make an assumption—say, that automobile demand will double. Then he could learn what would happen to the demand for tires—both original equipment and replacements—by doubling the appropriate number in the inverse grid.

What It Might Do

The input-output technique will not end all business worries. Widest use of the grids will probably be in market research and production planning: defining markets, sizing up competition, checking efficiency against the rest of the industry.

Here are some of the ways this new tool might help a typical manufacturer—a maker of screws, nuts, and bolts, for example:

To begin with, he could find out all the industries that use his products by looking at the grid. He has no other way of knowing. A large part of such a producer's output goes first to intermediate fabricators before it reaches the ultimate consumer. The manufacturer loses track of a shipment once it leaves his plant. Only after government statisticians have worked over mountains of data and come up with grid figures do the answers emerge.

Inspection of the grid will reveal another important fact: the screwmaker's share of his industry's business. On a 200-by-200 grid, the manufacturer can compare how much he sold to any of the other 199 categories on the grid with how much the industry sold as a whole.

Next the screwmaker can ask input-output to tell him how the demand for his product would be affected by a major change in economic conditions. For example, if the government decided to build twice as many dams, the direct demand for nuts and bolts at the sites would be easy to measure.

But input-output could tell the businessman how many nuts and bolts the generator builders would need—and their suppliers. The inverse matrix would give the screwmaker a numerical coefficient that could be applied to the additional construction funds to measure the change in indirect demand for screw products.

Other problems for which input-output may find solutions:

1. The effect of a steel wage increase on any business's cost structure. The inverse matrix tells a manufacturer how much steel he uses for each unit he makes, both directly for his own product and indirectly for the other materials he uses besides steel.

2. Working out weights for making special-purpose price indexes or for adjusting outputs to price-level changes.

Of course, input-output has limitations. Some can be removed; others are inherent in the method. One shortcoming is this: the grids give average unit cost of a product line, not the more significant marginal unit cost.

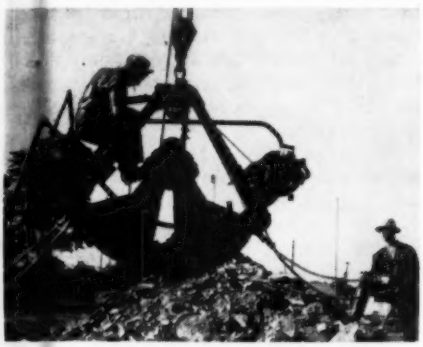
A weakness that can be cured is in the handling of capital goods. Eventually, the grid may tell what will happen if a plant is built to meet increased demand.—Business Wk, Dec 15, p94

Continuous Manufacture Gives High Pulp Yield

High yields was stressed by J. Limerick speaking at the recent Alkaline Pulping Conference on continuous manufacture of semichemical pulp for corrugating boards as carried on at Bathurst Power & Paper Co. Employing a "modified kraft liquor," 150 psi., and a 15-min. cooking time gives an 80% yield from unbarked hardwoods, chiefly aspen, beech, and birch.

The pulp is refined by two 48-in. Sutherland refiners in parallel and washed on a two-stage Swenson-Neiman washer, which delivers black liquor with 50% solids. In line also are two Chemipulper-Saplund Defibrator units.

A single flute crush test controls the entire operation. When the test shows a drop in rigidity of the finished board, necessary corrections are made.—Paper Ind, Nov, p942



MAKES CLAMSHELL A SHAFT MUCKER

To save mucking by hand, Perini-Walsh Co. designed and built this one-man self-powered muck-loading machine for its tunnel job at Niagara Falls. Two air hoists are attached to the main frames of a clamshell bucket. Also, a strap-iron bosun's seat is welded to one frame and the hoist throttles are extended to within reach of the operator riding the seat. The rig hangs from a hook on the load lines of a crane. One air hoist raises and lowers the clamshell. Other hoist opens and closes bucket. Operator, by working both hoist controls, lowers open clamshell over the muck, closes bucket, and raises it to dumping level over a skip.—Const Meth & Equip, Nov, p59

Electronic Weighing System

Electronic scale and recorder, developed by Streeter-Amet Co., may be installed at more convenient weighing points than is possible with a lever system. Also, the scale can record and print the weights at points away from the scale.

The unit incorporates Baldwin-Lima-Hamilton load cells. Weight causes a voltage change in the cell output. Potential difference is amplified to operate a servo motor, which both brings the system back into balance and operates the recording apparatus. A series of step cams convert rotational information from the motor to digital information on the printer.—Electronics, Dec, p136

For Temporary Construction

Low-cost, non-critical materials make up a new-type temporary structure. Designed by Patent Scaffolding Co., the buildings look like Quonset huts.

Only items shipped from the manufacturer are removable rib forms, form fabric, and wire mesh. For a 24x48-ft. standard hut, local materials required are 14 cu. yd. of sand, 5 cu. yd. of gravel, and 100 bags of cement.

The arch shell consists of 1½ in. of cement plaster reinforced with wire mesh. This wire is attached to waterproof bituminous paper, which acts as a form.

Huts can be constructed to any length by repeated use of the removable rib forms.—Const Meth & Equip, Dec, p108

Freon Unit Proves Success for Chlorine Liquefaction

Just 10 years ago, Pennsylvania Salt Mfg. Co. installed a Freon centrifugal refrigeration unit to liquefy chlorine. Previous to that, such systems used by the chlorine industry depended on brine, liquid carbon dioxide, or ammonia.

Experience with the Freon unit has shown that it has certain advantages over the other units: less space, power, and maintenance required; less refrigerant lost; easier to install.

The 65-ton Freon unit occupies only 200 sq. ft. of floor space and 1,600 cu. ft. of building volume. A carbon dioxide system of the same capacity would need 500 sq. ft. and 4,000 cu. ft.

Power saving is considerable. To compress and liquefy Freon requires 18 to 20% less power than for carbon dioxide.

Refrigerant loss in a carbon dioxide system averages 1½ lb. per ton of chlorine liquefied. Loss in the Freon unit is only 0.004 lb.

Both installation and maintenance are simpler. No massive foundations are needed, and installation can even be made on an upper floor. Maintenance savings are 49% in labor and 72% in material costs.—Chem Eng, Dec, p142

Watching Btu.'s Saves 25%

Saving $100,000 a year on the heating bill was done at Boeing Aircraft Co. by doing one thing—reducing unnecessary heat waste.

First step in the program was to set up a maintenance heating dispatcher's office with four coordinators to track down complaints and four "heat-run" men to check temperatures, change controls, and so on.

Offices are held at 68° F. and factory areas at 65° F. Air is recirculated wherever possible; each 1,000 cfm. of recirculated air represents a $35 saving per 8-hr. shift per year.

These and other practices, plus close supervision of the program, has meant a 25% saving in heating Boeing's 41 acres of buildings.—Power, Dec, p126

HOW TO INSPECT TINY BALLS

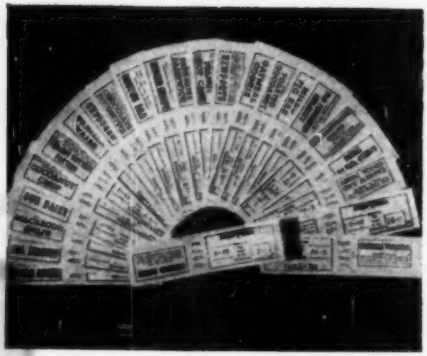
This young lady at SKF Industries, Inc., is inspecting 60,000 tiny steel balls for ball-point pens. Magni-Focuser that she is wearing permits her to look almost around each ball, speeds up inspection. Maker of the magnifier is Edroy Products Co.—Prod Eng, Nov, p199

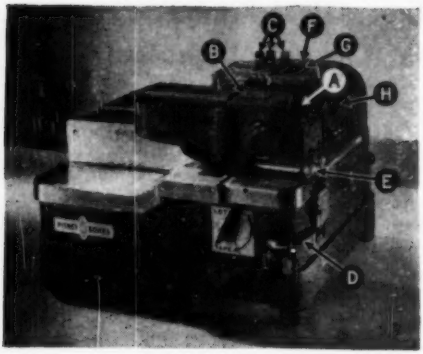
New Lead-Clad Materials

Two new clad metals announced by Knapp Mills, Inc., will reduce waste caused by sulfuric acid corrosion.

Ferrolum is a chemically bonded combination of lead and steel. It is made by automatic cladding machines under process patented and licensed by American Viscose Corp.

Cupralum is a bond of lead and copper. It adds copper's high electrical conductivity and heat-transfer value to lead's acid resistance. Promising applications: heating and cooling sulfuric acid, cooling of Freon, and in electroplating.—Iron Age, Dec 6, p114





POSTAGE METER DOUBLES AS LABEL PRINTER

Postage metering to cookie labeling is not too far apart at Clark Biscuit Co. A Pitney-Bowes mail postage meter was converted to printing labels showing net weight in cases, date (encoded), product identity, and ingredients. Door A is opened to change product and ingredient plate, door B for access to cylinder for changing date. Levers C control weight-print. Pressing control D delivers label at E and records at F. Dials G and H show weight totals. Net result: faster labeling, fewer operators needed and bookkeeping is greatly simplified.—Food Eng, Dec, p141

Metered Time Boosts Effective Machine Use

West Lynn plant of General Electric Co. has started a program to increase productive hours of installed equipment. The program, known as metered time, makes use of time-indicating and electrical instruments to measure actual machine performance.

Results are sometimes startling. Machine utilizations estimated at 40 to 50% or more have proved to be from 10 to 20%. Reasons for lost time are then determined.

A good example is the study made with time meters on a jig borer. One meter was wired to show running time of the motor; another to show the time the clutch was engaged. Actual boring time was found to be 12% of the day.

The rest of the time was spent in setup. So a special setup plate was designed to allow setups to be made on the bench. They then were moved to the machine for boring. Effective utilization of the machine was boosted to almost 70%—more than five times the previous performance.—Am Mach, Nov 26, p121

Process Pump Has No Seals

New centrifugal pump needs no seal between pumped liquid and the atmosphere. That is news, because the chief cost in operating centrifugal pumps is maintenance of the pump packing.

The Hermetik pump, made by Atlantic Pump Corp., combines motor and pump in one unit. The only connections outside are the suction and discharge pipes and the electrical wiring. No shaft extends through the casing.

The only moving part is the rotor-impeller. It is built up of laminated sections and is driven by the rotating magnetic field of the stator. Gap between rotor and stator is sealed with stainless steel. Pumps come in sizes up to 10 hp.—Chem Eng, Dec, p190

Six Ideas to Improve Welding

Your welding department can put these ideas to work for you on flash welding, critical jobs, overlaying, cleaning of castings

THE 32ND ANNUAL MEETING of the American Welding Society, held in Detroit in October, attracted international attention. Present were representatives from Belgium, China (Nationalist), France, Germany, Holland, Italy, Japan, Norway, Portugal, Sweden, Switzerland. Here are a few highlights of what they heard in the 21 sessions:

1 Discussion on flash welding of jet-engine parts brought out that more and more is being learned about welding of heat-resisting alloys. No revolutionary change in technique is necessary, but these alloys are weldable over a rather narrow range of welding variables. Good practice is to preheat by bringing parts together with light contact just before flashing at lowest possible voltage, to use an upsetting pressure as high as 35,000 psi., and to anneal welded parts to improve properties of the welded joints.

2 A new spot welder was described that may prove useful for joining both ferrous and nonferrous metals. It has electromagnets to vary tip force as contact resistance varies. It is now in use to weld fine silver, coined silver, and tungsten in electrical contacts. Primary application of the machine is for critical welding jobs, such as welding tungsten to steel.

3 Excellent overlay coatings can be applied by first metallizing the surface to a controlled thickness, then fusing the metallized coating with a gas torch. The flame makes the surface glassy. This "fused metallizing" technique has been successfully used by the U. S. Navy to coat steel propeller blades and shafts with crack-free, corrosion-resistant alloy. Industrial applications included coating a tool-steel mandrel with chromium-nickel-boron alloy; mandrel life rose from 75 operations to 35,000 operations. A modified form of this alloy, with silicon added, allows local repairs and enables the coating to cool in air without crack formation.

4 New technique, called "flame washing," removes fins, pads, adhering sand, chill nails from castings. A hand torch with gouging tip is employed with an air-borne stream of iron powder. It can reduce foundry cleaning costs by 50%.

5 "Nested" electrodes are something new. Such an electrode is formed of two or more core wires bound together with Scotch tape. Electrodes are insulated from each other except where they are gripped by the electrode holder. Different nesting patterns can be made. Advantages: different core materials may be combined; high amperage may be applied; puddle shape can be controlled; small welds can be made at high speeds.

6 Advantages of welding carbon steels by the inert-metallic-arc method are increased welding speeds and avoidance of flux contamination. Adding 5% of oxygen to the argon shielding gas increases the droplet rate and also has a beneficial effect on the weld puddle. Adding this small amount of oxygen does not cause oxidation. —Weld Eng, Dec, p 17

FAST CANDY PACKAGING

Improved packaging method for chocolate drops at Kroger Co. employs a canvas belt conveyor 2½ ft. wide. Candy pieces from enrober are carried to packaging stations and guided to operators by five adjustable baffles set at 45° to conveyor. Operators work in pairs. One girl pulls candy off belt, weighs and bags it. Other girl heat-seals bags and packs them in shipping cases.—Food Eng, Dec, p82

Better Power Distribution For Trackless Mining

Most power distribution systems in mines changing to trackless mining methods are inadequate. To meet present needs of highly mobile machines, sectionalized power-distribution systems should meet these requirements:

1. Adequate size of conductors to deliver acceptable voltage.
2. Well located protective devices to insure sufficient short-circuit current.
3. Delivery of power to mobile equipment with sectionalized cable and connectors.
4. Switchgear designed for portability.
5. Design making it impossible to have improper connections.
6. An individual "on" or "off" circuit.
7. Each circuit with its own line-to-line and also line-to-ground protection.
8. Safety ground wires.
9. Safety ground trip to remove a cable or machine from feeder at first instance of insulation failure.—Coal Age, Dec, p100

How to Get Good Start-Ups

Fine-gage full-fashioned machines give trouble at starting-up time. Reason is that the tolerances between picot points and sinkers and between dividers and knock-over bits are so limited.

Parts are subject to expansion and contraction and do not run well until they are brought up to operating temperature. The center bar reaches a temperature of about 94° F. when the machine is running. When the machine is stopped for an hour or more, the temperature drops to room temperature. When the machine is started again, it will not function properly until the center-bar temperature rises again.

Vanette Hosiery Mills installed a heating cable between the jack heads and center bar that keeps the center-bar temperature constant. A thermostat automatically controls the temperature to within 110° F.—Textile World, Dec. p121

Hydraulic-Drive Diesel

A 50-ton diesel switcher, built by the Plymouth Locomotive Works, is equipped with a hydraulic torque converter and planetary transmission. A 328-hp. engine drives the locomotive. Maximum tractive force is 45,000 lb.

The torque converter is connected by flexible couplings and provides an infinite number of ratios including zero. Power from the torque converter is transmitted directly to the planetary transmission by a flexible coupling. This transmission gives the locomotive two speeds.—Railway Age, Dec 3, p96

Standard Substation Design Brings All Cost Down

Standard semiautomatic step-down transformers can be designed to make them cost competitive with outdoor unit substations. Cleveland Electric Illuminating Co. has proved this to be true.

Maximum economy in electrical design was the primary objective. Use of 5,000/6,250 kva. three-phase load ratio control transformers provided for a regulated bus, compensated for load. Feeders are laid out in three groups. Shortest feeders rely on regulated bus without individual voltage regulators. Medium-length feeders have two single-phase regulators in open delta. Long feeders have three regulators in delta.

Each of six substations built has two-section bus, with one transformer and five feeder positions per section. Transformers are paralled on 4,800-volt bus. Circulating current control method balances transformer load. Switchgear is prefabricated metalclad.

Secondary objective was to save on building design. Reducing number of regulators needed and installing regulators in row against outside wall saved floor space.

Other design savings included: incandescent lighting and exposed conduit; duct lines under floor instead of cable tunnels; battery compartment instead of separate battery room; leads on open cable racks instead of transformer lead in steel ducts; and common brick for wall instead of glazed brick. —Elec World, Nov 19, p116

FOR MASS WATER MOVEMENT

The lady will not stay there permanently, but she does show how big a 37,000-lb. pump impeller is. Impeller is for one of six 22,500-hp. centrifugal pumps for a California irrigation project. Pumps, made by Worthington Pump & Machinery Corp., will pump 3-billion gal. per day against 200-ft. head. Each pump discharges through 9-ft. dia. butterfly valve into 10-ft. pipe.—Power, Dec, p78

How To Anneal Flat Parts

Parts that must be held within close limits as to flatness are annealed under weights at International Business Machines Corp.'s Endicott plant. Annealing under clamping pressures was tried but did not work well. But parts laid between flat faces in fixtures under constant pressure of a weight were held often to within 0.003 in. of flatness.

Fixtures are merely plates of low-carbon steel that have been ground flat. The upper and lower plates may be held in alignment by pins or wire. Parts are stacked between plates so there is no cocking or overhanging. Pressure must be uniform.

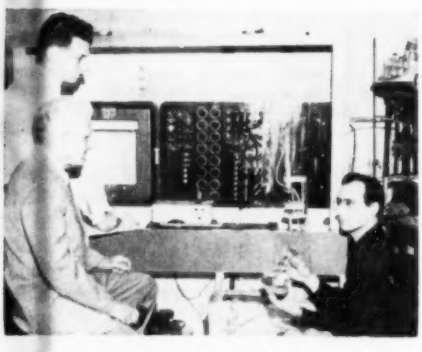
Loaded fixtures are placed on the wire-mesh belt of a continuous electric annealing furnace. Heating is done in an exothermic atmosphere. After passing through an 8-ft. heating zone, parts are cooled slowly in a 29-ft. zone to 300° F. before they discharge from the furnace.—Iron Age, Nov 1, p134

NEW EQUIPMENT...

Nylon Valve Seats—Machined from FM-10001 nylon rod, valve seats provide better seating and longer wear. Suggested uses include oxygen, hydrogen and helium regulators as well as for high-pressure aircraft check valves.—**Polymer Corp. of Pa.**—Ind Dist, Nov, p144

Featherweight Spray Gun—Type TGA spray gun can handle wide range of work—from touching up small spots to refinishing large objects. Weight is only 13¾ oz. Air needed is 4 to 5 cfm. at 40 psi.—**DeVilbiss Co.**—Ceramic Ind, Nov, p114

Draws Isometric, Dimetric Views—Vibax drafting machine automatically produces isometric or dimetric views by tracing over lines of standard orthographic drawings. It can be installed on any drafting board in a few minutes.—**Indamer Corp.**—Prod Eng, Nov, p209



ANALYZES SOLUTIONS

New electronic instrument qualitatively analyzes unknown solution, determines concentrations of dissolved substances, and separates out pure fractions. Developed at University of California, the instrument is a continuous-flow recording spectrophotometer. Operation is based on passing unknown solution through resin chromatographic column and carrying adsorbed ions through modified Beckman spectrophotometer.—Chem Wk, Nov 17, p30

Handles Drums—Horizontal drum-handling device can be attached to any industrial fork truck without removing forks or making any hydraulic or mechanical connections. The device, completely automatic, fits over forks and is clamped to them. It will handle two standard drums.—**Yale & Towne Mfg. Co.**—Auto Ind, Dec, p57

Dehydrates Diesel Fuel—Free or entrained water is removed from diesel fuel with new device. Fuel is passed through wound cellulose cylinders, specially treated coalescing media, and perforated metal and glass cloth.—**Bowser, Inc.**—Railway Age, Dec 10, p61

Germanium Power Rectifier—Small germanium rectifier is designed for power supplies in radio and television sets. Features: 3.5-ohm forward resistance at 350 ma.; 400-ma. average d-c. capacity; 400-v. peak inverse; 1-megaohm back resistance at 350 v.—**General Electric Co.**—Electronics, Dec, p146

Fluorescent Whitener — New whitener, 4-methyl-7-diethylamino coumarin, is recommended for masking yellow colors in oils, papers, white polishes, paints, lacquers, and textiles.—**Carlisle Chemical Works, Inc.**—Chem Wk, Nov 24, p52

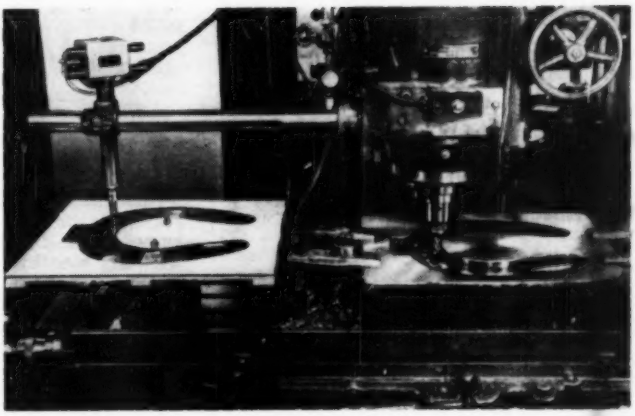
Rustproof Precision Parts—Rubbing and sliding surfaces of precision parts get two-fold protection with a chemical treatment known as Rustshield 2. It is a phosphating compound that changes steel and iron surfaces to rustproof, highly-absorbent, non-metallic areas. Close tolerances are unaffected.—**Octagon Process, Inc.**—Const Meth & Equip, Dec, p14

Synthetic Rubber Flooring—Exceptional strength, long life, and high resistance to acids, alkalies, and water are claimed. No preliminary bonding is required. It is adaptable to resurfacing, patching, and leveling.—**Flash-Stone Co., Inc.**—Am Builder, Nov, p154

. . . AND MATERIALS

AUTOMATIC CONTOURING UNIT

Duplicator is attachment for standard machine tools that enable them to follow templet or model, thus performing automatic contour milling, turning, boring, shaping. Electric tracer controls hydraulic motors coupled to machine feed screws. Attachment can be added to machine without interfering with normal operation. Tracer Control Co. distributes unit.—Am Mach, Oct 15



Quenches Armor Plate—Huge 2,500-ton quenching press handles armor plates from ½ to 2 in. thick. Bed size is 72x235 in. Press dies hold plates under pressure while they are sprayed with cold water. Plates are quenched in less than 2 min., need no straightening.—**Hydraulic Press Mfg. Co.**—Iron Age, Dec 6, p180

Light for Emergencies—The Lightguard has one or two battery-operated Sealed-Beam floodlights that can be turned on automatically when power fails. Restoration of power turns off lights and turns on battery charging unit.—**Electric Storage Battery Co.**—Elec World, Nov 5, p174

Sprays Burns—Aerosol-bomb-type spray applies thin coating of topical anesthetic on burns, sunburn, itching eczema, and wounds.—**Americaine, Inc.**—Weld Eng, Dec, p91

Protects Fabrics—Safe preservative protects textiles and other materials from attack by micro-organisms. It may be applied by the standard two-bath process from an aqueous dispersion or from a solution of organic solvents.—**Dow Chemical Co.**—Textile World, Dec, p166

Produces Payroll Records — Summary cards can be obtained as a byproduct of regular tabulating operation. System prepares payroll records and reports quickly, accurately, and inexpensively. Time required is fraction of time for detailed bookings. Clerical help is cut.—**Remington Rand, Inc.** — Am Business, Nov, p62

Packs Granular Products—Automatic rotary and conveyor combination packs granular products in flat-bottom containers having either wide or narrow openings. Vibration permits products to settle fully at high speed.—**Frazier & Son**—Mod Packaging, Nov, p140

Portable Spot Welding — Porto-Spot Welder weighs 24½ lb. including arms, electrodes, and cable. Welder employs "squeeze and heat" process.—**Marquette Mfg. Co.**—Fleet Owner, Dec, p77

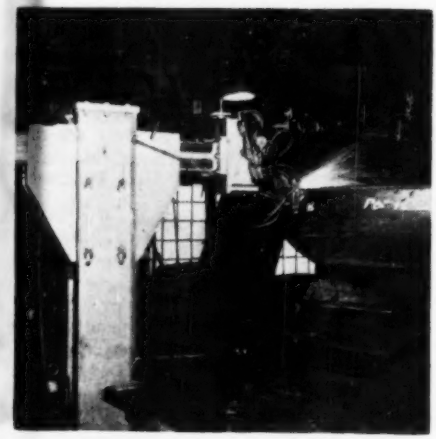
Packaged Boilers—Two new packaged water-tube boilers are ready to install. They fire either gas or oil. Capacities at 160 psi. are 4,100 to 11,600 lb. per hr. for model W-2.—**Wm. Bros Boiler & Mfg. Co.**—Power, Dec, p184

NEW EQUIPMENT (Cont.)

Fireproof Wallboard—Single-layer application of wallboard meets most fire code requirements for fire-resistant interiors. Gypsum core reduces shrinkage and cracking when heated.—**Certain-teed Products Corp.**—Am Builder, Dec, p152

Flat White Enamel—Dulux Super-White Flat Enamel is offered after 4 yr. of field testing. It combines soft decorative appearance of flat paint with hardness and durability of enamel.—**E. I. du Pont de Nemours & Co.**—Chem Wk, Nov 17, p48

Bakes Different Materials—Portable electric oven has eight drawers that can bake or dry different materials at the same time. Temperature is adjustable to 325° F. Fan circulates hot air from magnesium strip heaters. — **Grieve-Hendry Co.**—Iron Age, Nov 29, p108



FLAME CUTTING ON BORING MILL

Three-torch heavy-duty flame-cutting machine bevels 12-ft. dia. dished tank heads for welding at General-American Transportation Corp. Torch block is mounted on tool-support member of large boring mill. Horizontal arm is counter-weighted to allow torch to float and follow tank-head contour. Torch bevels head at 14 in. per min.—Weld Eng, Dec, p56

Polyamide Resin—New resin No. 90 has good solvent resistance and high melting point. When properly plasticized, it makes effective coating for paper and other materials that is resistant to water, water vapor, and grease. It shows promise as molding compound and binder.—**General Mills Co.**—Chem Eng, Dec, p197

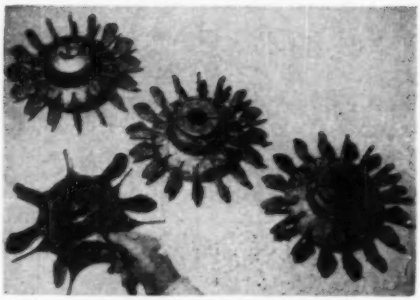
Extra-heavy Fork Truck—New Yardlift-150 is designed for outdoor handling of loads to 15,000 lb. Features are pneumatic tires, wide axle to provide good stability under load, 22-in. dia. handwheel that operates hydraulic control for easy steering.—**Clark Equipment Co.**—Am Mach, Nov 26, p182

Protects Plane Parts—New transparent plastic tape prevents galvanic corrosion between aluminum and magnesium aircraft parts. Tape is thin enough to have small effect on strength of riveted sections when used as a spacer.—**Minnesota Mining & Mfg. Co.**—Aviation Wk, Dec 17, p72

Versatile for Construction—Model 80 machine operated by one man tamps, backfills, lays pipe, unloads and handles pipe and sheathing, and does all kinds of light crane jobs. Machine is mounted on crawler having 24 speeds from 1 ft. per min. to 2⅛ mph.—**Cleveland Trencher Co.**—Oil & Gas J, Nov 22, p93

Junior-size Case Sealer—New sealer is short and narrow. Its chain construction is claimed to eliminate jamming of cartons. Easily adjusted unit in three models will handle wide range of cartons.—**A-B-C Packaging Machine Corp.**—Food Eng, Dec, p121

Industrial Switch—Maintained-position switch, designated as type A-C-O switch, is intended for machine tools, timers, recording equipment, safety circuits. First press transfers contacts; second press restores them. Contacts are single pole, double throw and are rated at 20-amp., 125-v. ac.—**General Control Co.**—Elec C&M, Dec, p87



SCARCE MATERIALS SAVED

Plastic blowers molded of polyester resin reinforced with glass fibers replace aluminum and bronze blowers in small, totally enclosed, fan-cooled a-c. motors made by Westinghouse Electric Corp. Glass fibers have proved superior to organic fibers because of higher resistance to chemical attack and higher strength.—Prod Eng, Dec, p185

Now in Cough Medicine—An antihistamine has been combined with a benzoinated syrup and other ingredients for treatment of certain allergic coughs and infections, as well as head colds. Antihistamine is thenylene fumarate.—**Abbot Laboratories**—Chem Wk, Nov 10, p38

Convertible Jet Pumps—New ¾- and 1-hp. pumps deliver up to 1,620 gph. and operate at depths up to 120 ft. They are powered by a condenser start motor on 115-230 v., 60 cycle ac.—**Delco Appliance Div., General Motors Corp.**—Hardware Age, Dec 13, p123

Weighs Big Airplanes—Compact electronic kit weighs all but the heaviest aircraft flying today. Weighing 95 lb., the rig is neatly packaged in a suitcase. Accuracy is 1/20 of 1%.—**Cox & Stevens Aircraft Corp.**—Aviation Wk, Dec 10, p64

Air Hammer Weighs 2 lb.—Light hand tool is designed to perform medium-heavy-duty maintenance and shop work. Tool works at 120 psi. and strikes up to 6,000 blows per min.—**Salsbury Corp.**—Eng News-Rec, Dec 6, p133

Grinder for Light Work—Light-type work requiring up to 18-in. swing is rapidly ground to fine limits of accuracy and finish in this machine. Features include: preset timing and grinding speed, click-count wheel feed indexing, automatic work rotation, and controlled coolant flow.—**Norton Co.**—Ind Dist, Dec, p152

Gel-time Meter—Device measures time required for fluid thermosetting compositions to reach a point of rapid viscosity change during polymerization. Objectives of device are to aid in evaluating thermosetting compositions and to study effects of variables.—**General Electric Co.**—Mod Plastics, Dec, p156

Continuous Ball Mill—Improved heavy-duty continuous ball or tube mill is designed for fine or coarse grinding (wet or dry) and open- or closed-circuit grinding. Horizontal unit has welded steel shell drilled for installation of replaceable iron or steel linings.—**Patterson Foundry & Machine Co.**—Chem Eng, Dec, p178

Drills Various Materials—Shot core drill is designed for efficient economical recovery of cores up to 20 in. dia. and to 600 ft. in depth. Shot bits are run to destruction; bit maintenance is negligible.—**Acker Drill Co., Inc.**—Coal Age, Dec, p118

Mechanized Broom — Floor cleaner scrapes, sweeps, and vacuum cleans. As operator drives it, a 36-in. cylindrical wire brush revolves at high speed, loosens grime and grease, and hurls dirt into hopper.—**G. H. Tennant Co.**—Business Wk, Dec 15, p56

READER SERVICE

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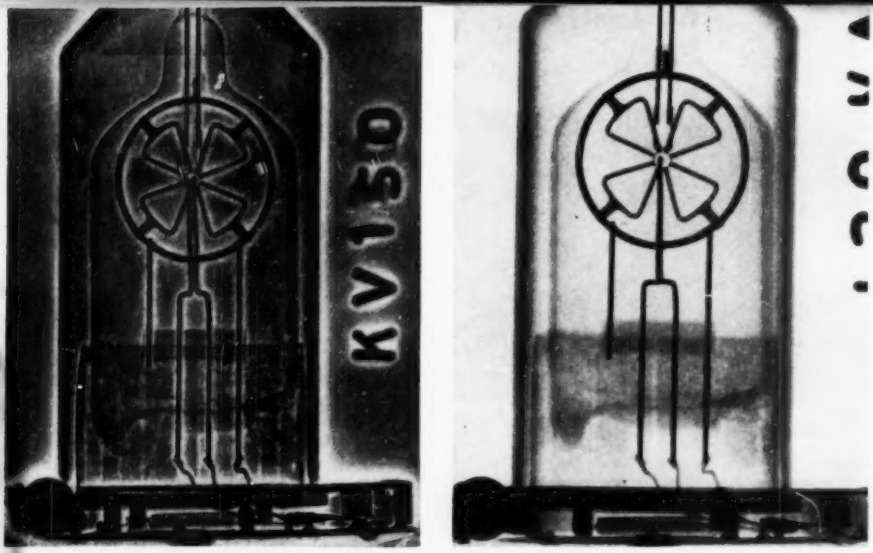


TUNABLE MAGNETRON ASSEMBLY has details shown by Xeroradiography (left) and on regular X-ray film (right). Internal details are more clearly declined by . . .

Xeroradiography Inspection

- **Novel X-ray inspection method requires no messy wet processing**
- **Images, brought out by simple method, are transferred to paper**
- **Plates may be reused and are not spoiled by accidental exposure**

RADIOGRAPHIC INSPECTORS are now offered a new method—Xeroradiography — that is claimed to have several advantages over conventional radiographic inspection methods.

The process, developed by Battelle Memorial Institute for the Haloid Co., is similar in principle to Xerography (McD-H Digest, Jan, 49, p33), a printing method for copying line drawings. Xeroradiography is a dry process, requires no wet processing or chemical solutions to develop the X-ray images, and may be developed immediately after exposure for fast evaluation.

Steps to make a Xeroradiograph consist of:

1. The Xeroradiographic plate, which is metal or glass coated with a semi-insulator sensitive to X-rays (such as selenium or sulfur), is first sensitized. Passing the plate under fine wires held at 7,000 volts causes corona discharge in the air around wires to deposit an electrostatic charge on the plate.

2. X-ray exposure of the sensitized plate causes the coating to become conductive wherever the X-rays strike and to discharge the electrostatic surface charge into the plate material. Thus the X-ray image pattern produces a "latent electrical image" on the plate.

3. Developing the exposed plate by flowing negatively charged powder over it brings out a visible image. The powder is made of a relatively coarse

carrier material and a finely divided powder. The powder clings to the charged areas only. Result is a positive X-ray image of the object radiographed.

4. The image can be viewed directly in scattered light. A permanent print is made by laying paper over the plate and again exposing it to an electrostatic charge. The powder then clings to the paper and is fixed by heating for a few seconds. Heat melts the resin powder granules and fuses them to the paper. The print can be stored indefinitely without deterioration.

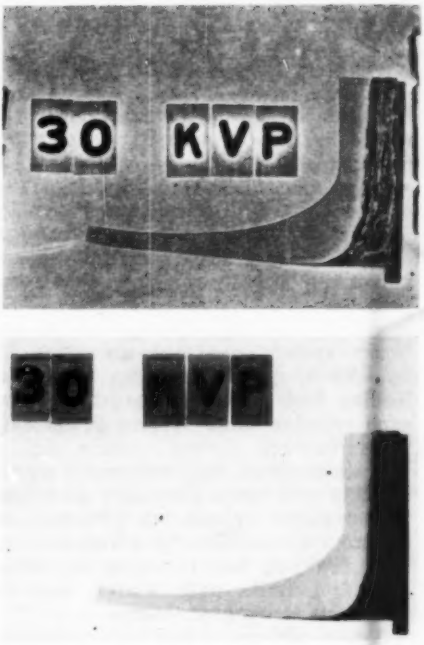
5. The original Xeroradiographic plate is cleaned for re-use by cascading over it a granular material that removes the residual electric charge and image pigment. If the plate becomes contaminated with powder, carbon tetrachloride can remove it. Plates can be reused for hundreds, possibly thousands, of exposures.

Xeroradiographic plates, materials, equipment, and techniques have been subjected to extensive tests throughout a wide range of X-ray voltages and exposure times. Included in the test was the tunable magnetron assembly shown.

This assembly of springs, wires, screws, and glass envelopes was radiographed with an industrial X-ray unit without filters at 150 kvp. and 7-ft. source-object distance. Exposure was 150 microamp.-sec. with the Xeroradiographic plates and 600 microamp.-sec. with regular X-ray film. Hidden parts were more clearly shown by local contrast sensitivity in the Xeroradiograph.

Another test was made on a molded plastic part with a fiber-glass insert. It was radiographed without filters at 30 kvp. and 36-in. source-object distance. Exposure was 188 microamp.-sec. on selenium Xeroradiographic plate and 560 microamp.-sec. on X-ray film. Both radiographs revealed all structural details.

Other tests have shown that the films



***FIBER GLASS INSERT** in molded plastic part is shown clearly by Xeroradiograph (above) and film radiograph (below). Radiographs were made at 30 kvp.*

on Xeroradiographic plates respond in electrical-resistance changes to irradiation by X-rays from sources rated from 5 to 10,000 kvp. and also from radium. Useable exposures range from several seconds to 18 hr.

Contrast sensitivities of 2% can be obtained throughout a wide range of materials and thickness—aluminum alloys from ¼ to 2 in. thick and ferrous metals of 1-in. thickness. Definition can exceed 500 lines per in. Speed is four to five times that of X-ray film, but decreases at higher kvp. values. Lead intensifying screens and filters improve speed and contrast.—Iron Age, Nov 29, p86

Engineering Developments—Chrysler Corp. Looks Ahead

Some of the developments recently revealed by the Chrysler Corp. are summarized below:

• A modified 180-hp. V8 Firepower engine (McG-H Digest, Apr '51, p25) powers the K310 experimental sports car (p59). Modifications include larger valves and valve ports, increased compression ratio, four carburetors, and modified camshaft. Changes in the exhaust system produced an extra 25 hp. Each cylinder has its own vent leading into a single exhaust pipe for each cylinder bank. Engine power output is 310 hp.

• A three-speed, fully-automatic power shifting unit has a planetary gear system engaged by clutches activated by electromagnets. Unit provides full engine braking, has no creep at idling speeds, permits push starts, and involves no cooling problems.

• A new carburetor has been developed that is much smaller than the current model. Present zinc carburetor weighs 7¼ lb. and is 5⅛ in. high. The new zinc model weights 3¾ lb. and is 4¾ in. high.

• A shell mold process for producing engine valves is in development. The process needs fewer operations prior to finished machining than does forging.—Auto Ind, Dec 1, p34

Oil Ash Tells Engine Story

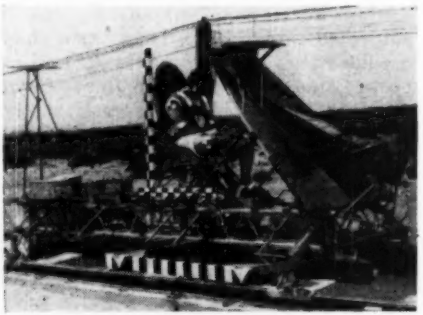
Spectrographic analyses of crankcase oil from diesel locomotives on Denver & Rio Grande Western RR serve as a preventive-maintenance tool. Burning and analyzing ash at least once every 60 days detects engine failures before they occur.

Excessive amounts of silicon, aluminum, titanium, and magnesium mean bad air filters. Iron, chromium, and aluminum in excess indicate bearing wear or corrosion. While ash color will tell whether the engine is operating properly, the spectrographic test tells also the quantities of metals present.

Ash of new oil is white. Bluish green indicates bearing corrosion, reddish brown excessive liner and ring wear, chocolate brown the same plus chromium from water contamination.—Am Mach, Dec 10, p189

High-Temperature Alloy

U. S. Air Force has developed a new light metal casting alloy for high-temperature service. Called ML aluminum alloy, it allows castings, supports, and other parts to be designed for temperature up to 600° instead of the former 300° F. At 600° F., it can support a 6,600-psi. load for 1,000 hr. Tensile strength, 33,000 psi. at room temperature, drops to 17,300 psi. at 600° F.—Prod Eng, Dec, p186



8,000-LB. LOAD NO BOTHER TO HIM

Decelerating at 45 Gs did not bother this test pilot and that is the same as loading 8,000 lb. on him. He did not black out on any of his rides on the rocket-propelled sled at Edwards Air Force Base, nor did he lose the ability to move his limbs, or to see or hear. The rocket sled runs on a 2,000-ft. track and is propelled by three 1,000-lb.-thrust rockets. Within 500 ft, the sled reaches a speed of 170 mph. It then coasts to 154 mph., and is braked down to 35 mph. in 31 ft. and about 1/5 sec.—Aviation Wk, Nov 26, p40

DUMP BODY FILLS BAGS

When rock was scarce, the Lane Const. Corp. decided to use bagged concrete as riprap. To minimize handling of the bags, Lane built this special dump body. Carrying 3 yd. of concrete, the truck fills the bags at the slope to be riprapped. Three hopper outlets are built into the rear bulkhead. Beneath outlets, strap-iron holders keep bags open during filling. Worker puts the bag on the holder and opens the gate to fill the bag. Then bags are rolled into position on the slope.—Eng News-Rec, Nov 15, p32

Foundry Core Driers

Electronic baking of sand-urea foundry cores is facilitated by fibrous glass reinforced polyester resin driers and core-boxes.

Driers for electronic baking must be made of a material that does not conduct high-frequency current. Also, driers must resist impact and abrasion. Reinforced polyester meets both requirements.

First step in production of driers is brushing a parting agent on the mold surface. The mold is then loaded with alternate layers of catalyzed resin and styrene-treated Fiberglas mat. The assembled mold is weighted, placed in an oven, and cured at 350° F. for 45 min. Burrs and irregularities are removed with a sanding wheel. Cavities are scraped to proper demensions.—Mod Plastics, Dec, p108

Top-Service Concrete Floors Require Heavy-Duty Mixture

Concrete floors with good surfaces speed up materials handling and, in food plants, improve sanitation. At the meat packing plant of Geo. A. Hormel & Co., floors are considered so important that the aggregate is even bought in bags rather than in carload lots.

But while aggregate size and quality affect the concrete, the amount of water is more important. Mixing water is held to 3½ gal. per sack of cement, including any moisture present in the aggregate.

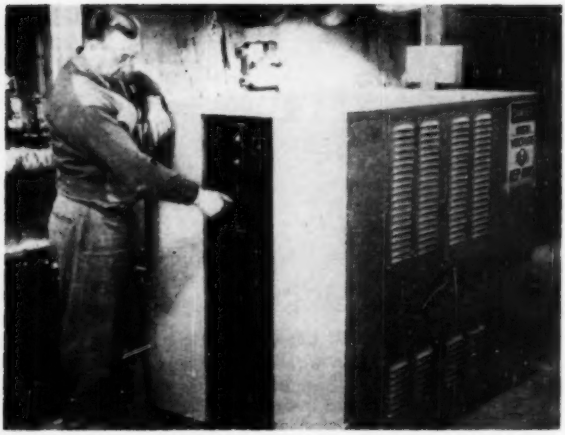
This amount results in a no-slump concrete that can be packed into a ball by hand. The mix is proportioned so the cement-water paste overfills aggregate voids by 5%. The materials are mixed for 3 min. in a revolving blade mixer.

This concrete reaches a 7,000-psi. compressive strength in 28 days. It can be employed as a monolithic or bonded finish. A base slab for a monolithic finish should be made with a mix that permits no excess water to appear at the surface.—Food Eng, Dec, p112

New In Trailer Design

A new trailer, similar in construction to the Unicel freight car, (McG-H Digest, Jan '51, p57), has been designed and built by the Pressed Steel Car Co., Inc. Construction material is laminated plywood molded electronically with specially formulated plastics into single unit structures. The only steel in the trailer is in the tandem axle, upper fifth wheel, and door frames. The tandem-axle, 32-ft. semitrailer weighs 11,000 lb. and has 1,735 cu. ft. of space. Load capacity is 40,000 lb.—Fleet Owner, Dec, p73

BOILER FUEL is petroleum pitch from a nearby refinery



PACKAGED LIGHTING UNIT of dry type contains induction regulator; this is the first use of such a unit

Power Plant Has Modern Ideas

Among these modern ideas is heating of boilers with refinery petroleum pitch instead of the more expensive pulverized coal

LATEST IDEAS in central-station design are being built into the new Gadsby steam plant of Utah Power & Light Co. They include reheat cycle, centralized control, automatic feedwater and combustion control, and electrically driven station auxiliaries with automatic functions carried to a high degree.

Boilers are of the radiant outdoor type and have enclosed firing aisles. They can burn petroleum pitch, coal, or natural gas. The usual fuel is petroleum pitch, which is the residue from the manufacture of gasoline and diesel fuel. It has a high pour point and at 225° F. is fluid enough for pipe-line transport. At 250° F., it can be atomized easily with steam.

The two boilers are rated at 620,000 and 575,000 lb. per hr. Burners for the first unit are conventional pulverized-coal burners. Coal supply piping has been omitted, and steam-atomizing oil guns are installed in the center of the burners. Net design efficiency is 32%. Expected economy is 11,200 Btu. per net kw.-hr.

Turbines are impulse reaction units rated at 60/66,000 kw., 3,600 rpm., 1,250 psig., 950° F. for the first unit and 60/75,000 kw., 3,600 rpm., 1,450 psig., and 1000° F. and reheat to 1000° F. for the second unit. Reheat was added to unit No. 2 to improve efficiency. Furthermore, an added advantage of 9,000 kw. was gained at no additional cost.

Generators are hydrogen cooled, 13.8 kv., three phase, 60 cycles, 70/81,000 kva., 0.5/15 psig. hydrogen. Generator leads are copper tube conductor enclosed in aluminum housing connecting

to the main transformer banks through flexible earthquake joints.

Station auxiliaries above 300 hp. are 4,160 volts and under 300 hp. are 480 volts. Normal supply is from 7.5-mva. bank with automatic transfer to standby source at the 4,160-volt level. Special design of motor control units permits transfer at zero voltage without loss of auxiliaries.

Both units are regulated from one control room. An annunciator system informs the operator of any electrical or mechanical faults. The room opens into the firing aisle and turbine bays.

Lighting is mostly incandescent, with fluorescent in only offices and the control room. A new kind of metal-enclosed dry-type transformer-regulator unit serves all lighting. It provides plus or minus 1% of nominal voltage. In case of alternating-current failure, emergency lighting is automatically transferred to the station battery.—Elec West, Nov, p78

New Material Cuts Costs

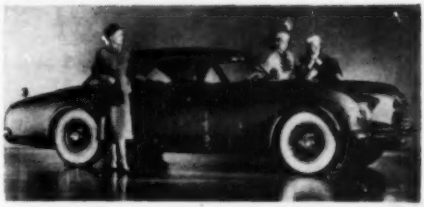
Simplified construction reduced cost of a recently completed automobile service station in Indiana by 12%. Two new building products made the savings possible.

The new products are Kaylo C-A (cement-asbestos) panels and insulating tile, made by Owens Illinois Glass Co. They are hydrous calcium silicate and have a density of 20 lb. per cu. ft.

The panels, fastened to light steel framing, make up the entire wall thickness. No siding, sheathing, insulation, lath, or plaster was used. The roof tile served as roof deck material.

These two materials allowed a reduction in building load and therefore use of lighter structural steel. A saving in labor cost was realized because both materials are easily handled and applied.—Am Builder, Nov, p116

Chrysler Corp. Has Deal for...



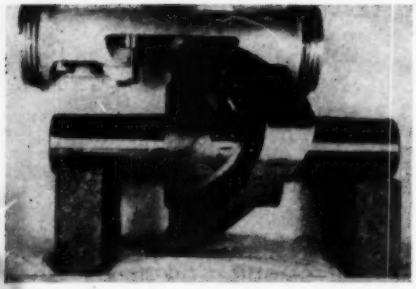
. . . European Bodies by Ghia

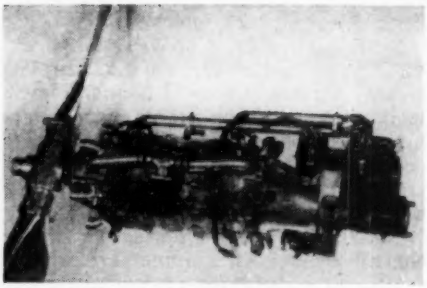
Carrozzeria Ghia is an Italian company that specializes in building sporty Continental-style auto bodies to go with the chassis of other manufacturers. It has made bodies for such chassis as the Plymouth (bottom). Now it has turned out a special model for Chrysler Corp. (top). It is still in experimental stages. The car takes a conventional Chrysler 180-hp. engine, but Chrysler has developed a new powerplant of 310 hp. that will also fit the chassis. The 310-hp. engine runs on ordinary premium gasoline.—Business Wk, Nov 24, p21

More Steel for Britain

By the end of this year, Britain will boost its pig-iron capacity by 560,000 tons. New blast furnaces and ore treating and handling facilities will raise capacity to 12,320,000 tons. Steel capacity will rise to 18,480,000 tons.

Unpredictable factors that may affect production include strikes and possible denationalization. The industry has been frozen in its current status pending formation of plans for returning it to private ownership.—Iron Age, Nov 29, p49





"ROUND" TYPE ENGINE FEATURES NEW DESIGN

The 12-cylinder, "round" type engine of Herman Engineering Co., is undergoing final tests. It has six integral double-end pistons actuating a cylindrical cam. Engine has a bore of 3¼ in. and a stroke of 3¾ in. Aircraft version produces 210 bhp. at 1,850 rpm. Main cam with one of the pistons and one of two rollers in each piston is shown at left. Cam is mounted on a straight shaft supported on two plain bushings. As the cam provides for four strokes per revolution of the shaft, the two valve cams are mounted on the main shaft. Combination provides a shaft speed half that of conventional aircraft engines.—Auto Ind, Dec 15, p23

Controlled Pressure Aids Deep Drawing with Rubber

Enough information has now been released that two late sheet-metal forming processes can be suggested as improvements over similar, older methods.

One is Marforming, developed by Glenn L. Martin Co. and sold, under license, by Hydropress, Inc. This technique is similar to the conventional Guerin process in which a rubber pad on the upper platen of a hydraulic press forms the blank over a form block laid on the lower platen.

But Marforming differs in having a blankholder apply a constant pressure on the blank as it is formed over a form block, or punch. This pressure prevents the wrinkling common with ordinary rubber forming. Pressure on the blank is controlled throughout the draw by cam control of the hydraulic pressure applied against the plate.

The second process is Hydroforming, developed by Cincinnati Milling Machine Co. Forming is done, not by a rubber pad, but by a flexible pad stretched over a pressure chamber in the upper platen. The punch is located on the lower platen. A blankholder prevents wrinkling. Principal advantage is low tool costs.—Am Mach, Dec 10, p138

Easy Truck Maintenance

New gasoline Clipper industrial trucks made by Clark Equipment Co. feature: easier accessibility to engine compartment, new-type parking brake, instrument panel mounted on steering column, and easier steering.

The No-Kick-Back steering is achieved with an Elliot-type axle that has tie rods in same plane and nearly in line with transmitted forces. Steering knuckles are as close as practical to the tire's dead-center shock point.

Maintenance time should be kept to minimum by having a "quick-change" clutch as well as ready engine accessibility.—Food Eng, Dec, p123

Better Handling Methods

Here is a mill that had troubles because of inefficient handling methods. How it solved its handling problems may help you in your mill

Do YOU have handling problems in your textile mill? Livingston Worsted Mills, Inc., had plenty of them. Here are some of them and how they were solved:

Top Storage

Problem: Store tops, keep them clean, and have accurate records.
Solution: The mill decided to use cardboard boxes that hold 24 tops each. Dye lots are multiples of 12, usually 6 or 8 doz. Boxes of top are stored five high with a pallet truck. Each box is ticketed with case number, weight, and date. Duplicate tags are sent to the main office and to the Top Department stores files.

Top Dyeing

Problem: Eliminate the handling of tops between dyeing and backwashing.
Solution: Dyed tops—3 doz. to a load—are put on a pallet. Then the load is put down right behind the backwasher and fed from the pallet. When one layer of tops is used up, the second layer is tied in. Formerly tops were placed on the floor—that meant unnecessary handling. Livingston has equipment for top, yarn, and piece dyeing. All the machines are stainless steel.

Drawing-In

Problem: Make better use of the time required to draw in and to change over looms.
Solution: A special frame holds the beam and harnesses. At the back a clamp keeps the warp tight. Drop-wires are put on during drawing-in without disturbing either operation. The mill has less mending to do now because every end has a drop-wire on it before the warp gets to the loom. Completed warps are put on a special truck that keeps the ends straight and has holders for the harnesses and drop-wires. Trucks are then lined up, properly ticketed, in an area near the looms.

Weaving

Problem: Arrange the looms for the best layout without redesigning the mill.
Solution: The bays were perfect for four looms—but that did not leave enough space at the back of the looms. So a Cleveland Tramrail overhead-handling system was installed. The empty warp and the new warps are handled by the overhead system. Warp-changing time was cut from 2 or 3 hr. to 30 min.

Finishing and Inspecting

Problem: Make the job at the decating machine easier.
Solution: Hoist-and-rail unit lifts cloth roll. One man does job.
Problem: Do something about tacking cost.
Solution: Uxbridge tacker helped here. One man instead of four are needed.
Problem: Improve perching.
Solution: Power-driven perches that the workers operate from the front were installed. A clutch and gear reduction on the motor drive help here. The cloth is taken from one truck and automatically folded onto another after perching. A flat-top truck handles twice as much cloth as old truck. The old truck had small sides that sometimes caused cloth to drape or fall on the floor.—Textile World, Dec, p122

Subminiature Flight Radar—Design Problems, How Solved

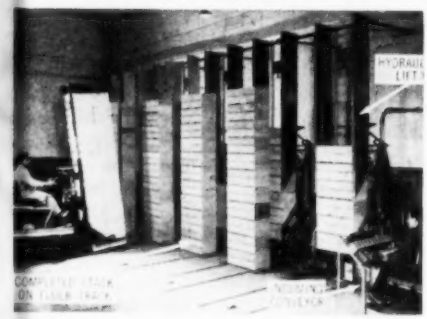
Airborne radar equipment is getting smaller and smaller. But miniaturization brings with it many problems the designer must solve. Some of them are:

Heat—Closely packed electronic tubes and associated components give off a lot of heat. Temperature control of the subminiature radar is a major problem. A properly arranged heat-conducting chassis is needed. But high altitudes reverse this situation and resistance strips may have to supply heat.

Pressurization—Sealing the package housing cylinder in an atmosphere of air or inert gas may be the answer.

Resistance to vibration and shock—Mounts and dampers must be carefully selected if the unit is to withstand high-speed flight and rapid accelerations.

Design approach—First the designer establishes component values and feasibility of initial arrangement with standard parts. After this, the subminiature layout is set up on an experimental panel with wide spacing between components. Adjustments and changes are made and then the various units are arranged on a circuit panel for final check before the required degree of compactness is obtained.—Aviation Wk, Dec 3, p57



1 MAN + PUSHBUTTONS = 12 MEN

One man sorts, stacks, and automatically counts up to 1,200 boxes per hour by pushbutton at Goleta Lemon Assn. It took 12 men to do the job manually. As boxes of lemons roll past on a conveyor, the operator classifies each box and pushes one of six buttons, corresponding to the classification. The appropriate hydraulic stacker then lifts the box from the conveyor and puts it in the stack. When the stack is 11 boxes high, the stacker automatically moves it to the front and sets it down, positioning two stacks for truck removal.—Factory, Dec, p98

Blend Raises Fuel Quality

A blend of amyl nitrates, the result of 4 years of research by Ethyl Corp., raises quality of diesel fuel. U. S. Navy is now testing the blend to find out if fuel quality can be raised without the added refining now necessary.

The blend seems to exert a catalytic effect on the fuel. After the tests are finished, the company plans to commercialize the product. A possibility is its future use to equalize quality of different grades of fuel and make diesel operation practical on a single grade.—Chem Wk, Dec 15, p23

Siliconized Molybdenum

Silicon-rich surface can be applied to molybdenum equipment by a method developed by Fansteel Metallurgical Corp. The coating permits exposure to high temperatures (3,000° F. for 50 to 300 hr.) and resists attack by oxygen, nitrogen, carbon dioxide, carbon monoxide, and sulfurous and hydrocarbon atmospheres.

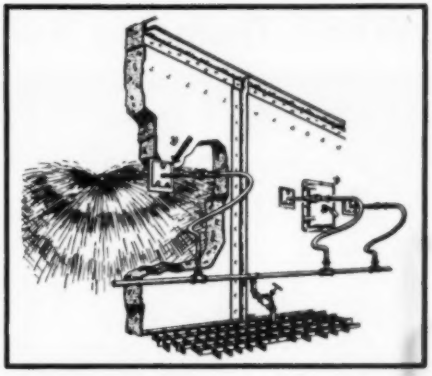
Uses include: nozzles, flame holders, thermocouple wells, jets, crucibles, probes, gas sampler tubes, wire for electrical heating elements. At present, only small items can be siliconized. Wire and rod lengths are limited to 30 in.—Oil & Gas J, Oct 25, p142

Employees Choose Colors For Office and Plant

These three ingredients help the South Wind Div., Stewart-Warner Corp., create in the employee a favorable attitude toward the company and his job: (1) an employee, (2) a desire to build a favorable attitude, and (3) a contact.

A good example of how these fundamentals can be applied is shown in a recent South Wind plant painting program. Management decided to let employees review the color plans for painting factory and offices.

Two color schemes were chosen, and scale-size mockups of a typical factory area were painted. They were then placed in the company cafeteria with slips of paper available for all employees to indicate their choice. The color scheme chosen appealed to employees because it "picked up the spirits"—something management might not have considered.—Am Business, Nov, p59



SPRAYS ARE EASILY REPLACED

This quenching spray for ash hopper can be inspected and even replaced in less than 30 sec. without tools. Six such sprays have been installed by Ohio Power Co. Lifting spray an inch frees mounting plate from bottom holding lugs so it can be withdrawn from hole for inspection. Sprays reduce hopper maintenance, improve working conditions.—Elec World, Nov 19, p134

Automatic Ring Lubrication

Centralized lubrication of its twister rings has solved the problems of manual lubrication at the Textile Products Div., Owens-Corning Fiberglas Corp. With manual ring-oiling methods, over-lubrication caused oil spots on yarn, and under-lubrication caused short traveler life.

A method for applying a small measured amount of lubricant at frequent intervals was needed. So the mill equipped its ring twisters with a Lincoln Centro-Matic oiling system. This automatic system consists of an electrically operated lubricant pump that supplies oil to dual metering injectors on the ring tail.

Injectors are operated by a positive displacement pump. The injectors can be easily adjusted so that each ring receives a uniform, measured amount of lubricant on each cycle. An automatic time clock sets the time interval between lubrication cycles.—Textile World, Dec, p131

Air Tamping Saves Time

Switching from hand tamping to air tamping for backfilling of pole holes saved $7 per pole for Portland General Electric Co. An Ingersoll-Rand tamper was modified by turning the 5-in. head down to 3 in. to fit the hole around the pole and by replacing the usual 24-in. length of pipe by 8 ft. of steel tubing.

Two men operating tampers, two men shoveling, and one man handling hose and valves can tamp a 60-ft. pole in 5 min. An added advantage of air tamping is that poles are set more solidly. —Elec West, Nov, p77

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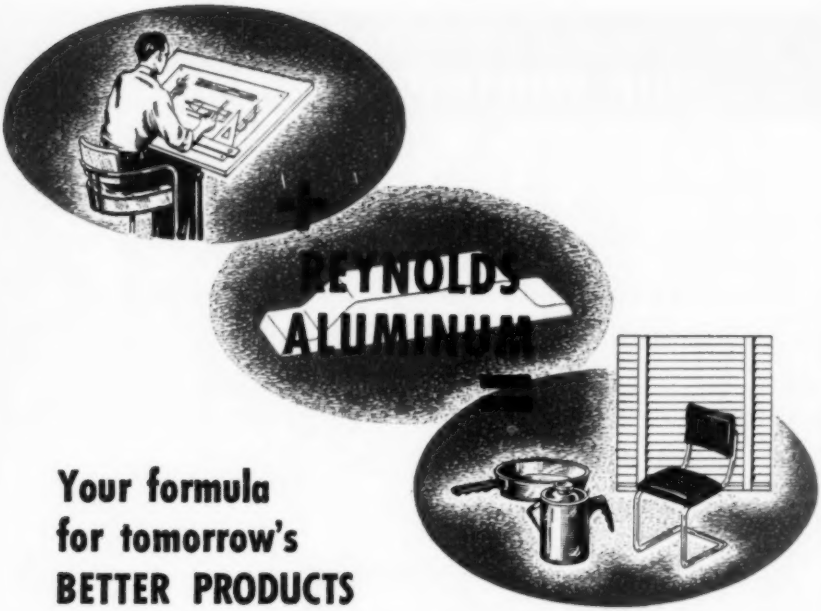

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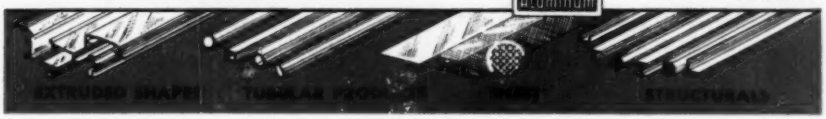

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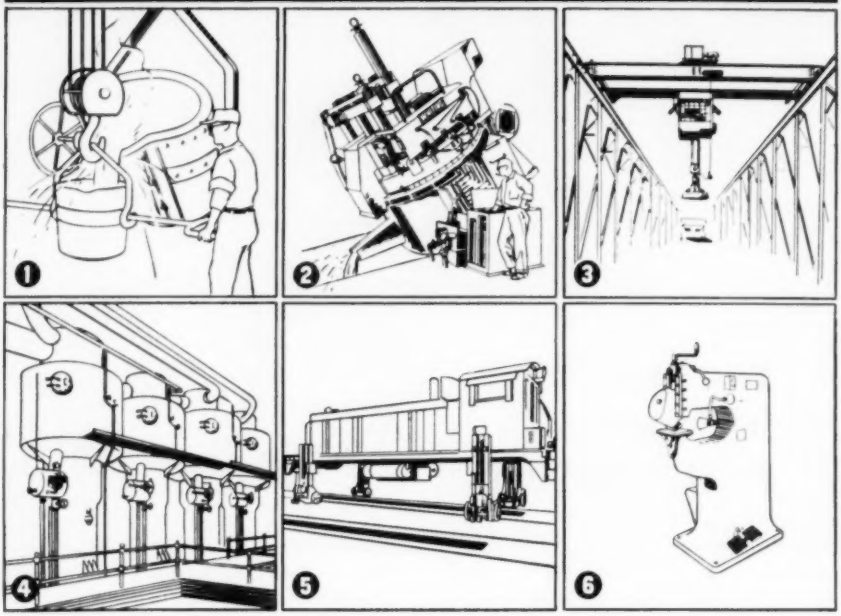

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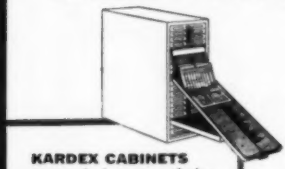

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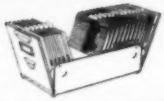

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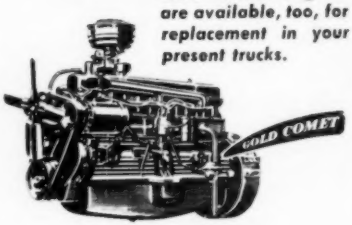

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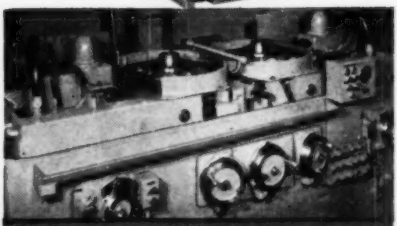

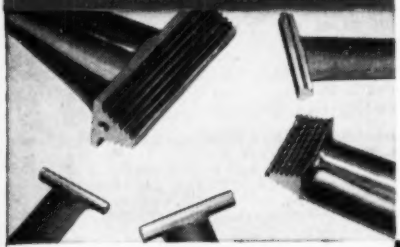

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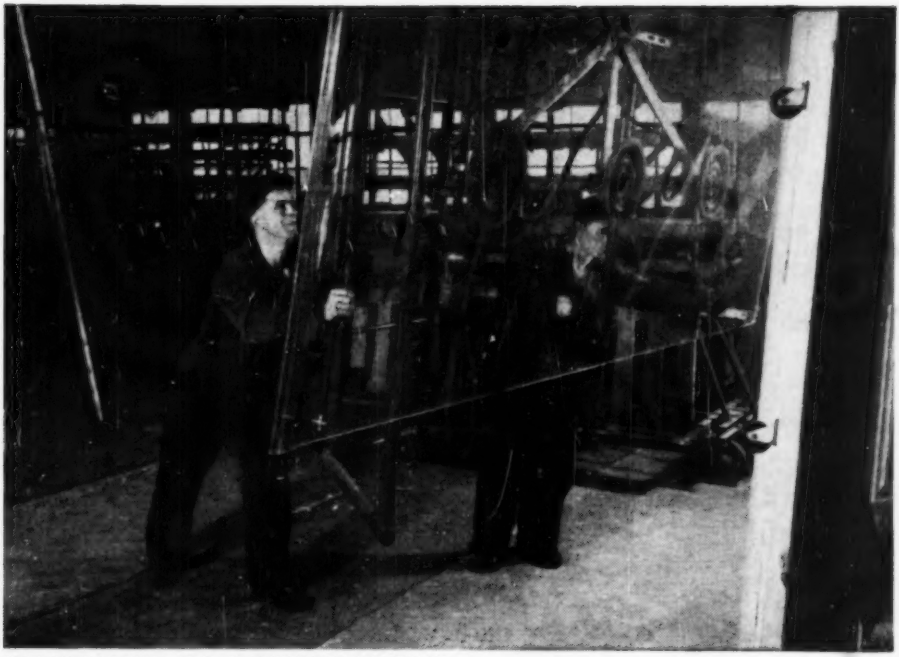

GLASS FACTORY, BELGIUM—GLASS SHEET SUPPORTED BY SUCTION CUPS

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with the aid of Petroleum . . .

In virtually all branches of science, industry and commerce, glass is opening new vistas to the modern world, and in many ways petroleum is furthering the advancement of the glass industry.

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ESSO, a famous name in the field of petroleum research, is proud of having created many of the lubricants indispensable to the glass and other industries. Every step of industrial progress means increased demand for petroleum, and as petroleum products contribute to the expansion of industry, people all over the world benefit.

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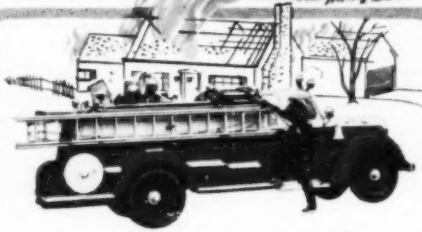

For complete data on FMC Fire Fighters write *Export Dept., John Bean Division, Lansing, Michigan, U. S. A.*

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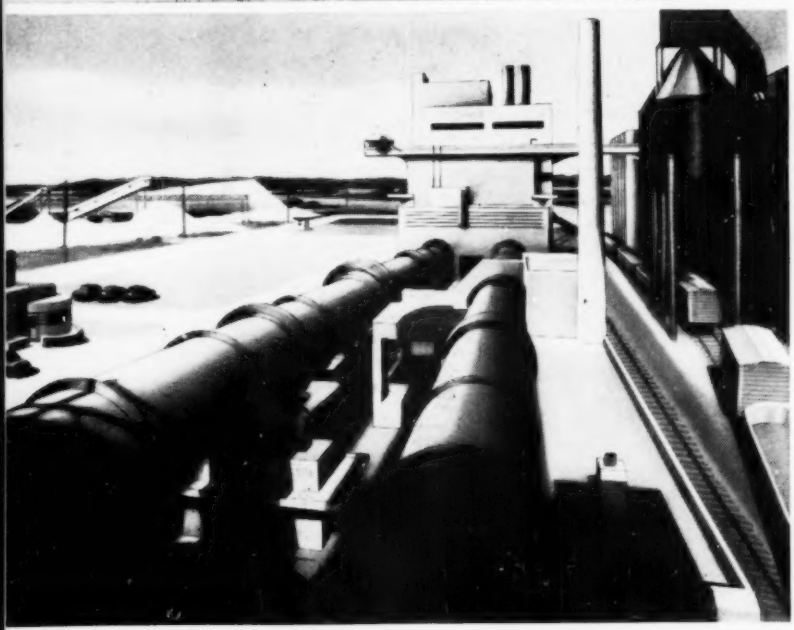

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